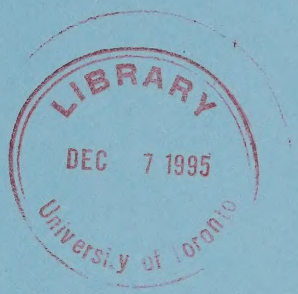
National Energy Board

Reasons for Decision

TransCanada PipeLines Limited

GH-3-95



November 1995

Facilities

National Energy Board

Reasons for Decision

In the Matter of

TransCanada PipeLines Limited

Application dated 18 April 1995, as amended, for 1996 and 1997 Facilities

GH-3-95

November 1995

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Abbreviations

ACQ	Annual Contract Quantity
AOOC	Annual Owning and Operating Costs
Act	*National Energy Board Act*
Altresco	Altresco Pittsfield, L.P.
the assessments	environmental and socio-economic assessment reports
Atlantic	Atlantic Packaging Products Ltd.
Bcf	billion cubic feet
Bcf/d	billion cubic feet per day
Board, NEB	National Energy Board
Brooklyn Navy Yard	Brooklyn Navy Yard Cogeneration Partners, L.P.
CEAA	*Canadian Environmental Assessment Act*
CGM	Coastal Gas Marketing Company
cm	centimetres
CNG	CNG Energy Services Corporation
COSEWIC	Committee on the Status of Rare and Endangered Wildlife in Canada
CWH	Critical Wildlife Habitat
Centra Gas	Centra Gas Ontario, Inc.
Consumers'	Consumers' Gas Company Ltd. (The)
Conwest	Conwest Exploration Company Limited
Czar	Czar Resources Ltd.
dBA	decibels ("A" weighted)
DCQ	Daily Contract Quantity
DFO	Department of Fisheries and Oceans

DLN	dry, low NO_x
Delmarva	Delmarva Power & Light Company
ECT Canada	Enron Capital and Trade Resources Canada Corp.
ECTR	Enron Capital and Trade Resources Corp.
EIA	Environmental Impact Assessment
EIL	Environmental Issues List
EPN	Early Public Notification
EUB	Alberta Energy Utilities Board
Eastern Canada	Manitoba, Ontario and Québec
FERC	U.S. Federal Energy Regulatory Commission
FMAs	Forest Management Agreements
FS	Firm Service
FST	Firm Service Tendered
FT	Firm Transportation
GH-4-88	Hearing Order GH-4-88 in respect of TransCanada's application for 1989-90 facilities
GH-1-89	Hearing Order GH-1-89 in respect of TransCanada's application for 1990 facilities and various applications for natural gas export licences
GH-5-89	Hearing Order GH-5-89 in respect of TransCanada's application for 1991 and 1992 facilities and various applications for natural gas export licences
GH-3-91	Hearing Order GH-3-91 in respect of various applications for natural gas export licences
GH-4-91	Hearing Order GH-4-91 in respect of TransCanada's application for 1992-93 facilities
GH-2-93	Hearing Order GH-2-93 in respect of TransCanada's application for 1994-95 facilities
GH-5-93	Hearing Order GH-5-93 in respect of various applications for natural gas export licences

GH-2-94	Hearing Order GH-2-94 in respect of Facilities for 1995 and 1996
GH-3-94	Hearing Order GH-3-94 in respect of various applications for natural gas export licences
GH-1-95	Hearing Order GH-1-95 in respect of various applications for natural gas export licences
GH-4-95	Hearing Order GH-4-95 in respect of various applications for natural gas export licences
GHW-3-89	Hearing Order GHW-3-89 in respect of information on gas supply to be provided by TransCanada in support of its 1991 and 1992 facilities
General Electric	General Electric Company
Great Lakes	Great Lakes Gas Transmission Limited Partnership
ISO	International Organization for Standardization
Iroquois	Iroquois Gas Transmission System, L.P.
km	kilometre(s)
kPa	kiloPascals
Kingston CoGen	Kingston CoGen Limited Partnership
LDC	local distribution company
LILCO	Long Island Lighting Company
LT-WFS	Long-Term Winter Firm Service
m	metre(s)
m^3	cubic metres
m^3/d	cubic metres per day
MING	Many Islands Natural Gas (Canada) Ltd.
MMcfd	million cubic feet per day
MOEE	Ontario Ministry of Environment and Energy
MW	megawatts

Morgan	Morgan Hydrocarbons Inc.
NEB, Board	National Energy Board
NOVA	NOVA Corporation of Alberta
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
Northern Utilities	Northern Utilities, Inc.
Northland Power	Northland Power Iroquois Falls Partnership
OMNR	Ontario Ministry of Natural Resources
OPCC	Ontario Pipeline Coordinating Committee
Orbit	Orbit Oil & Gas Ltd.
PJs	Petajoules
PPBR	plans, profiles and books of reference
Québec Cogen	Société de Cogénération de Québec, Société en Commandite
RH-3-94	Hearing Order RH-3-94 in respect of an application for new tolls effective 1 January 1995 for TransCanada
R.M.	Rural Municipality
the Regulations	The National Energy Board Crossing Regulations
Renaissance	Renaissance Energy Ltd.
SERM	Saskatchewan Environment and Resource Management
STFT	Short-Term Firm Transportation
STS	Storage Transportation Service
Shell	Shell Canada Limited
Sproule	Sproule Associates Limited
Tcf	trillion cubic feet
TCNP	TransCanada Northridge Power Ltd.

TCPL Cogeneration	TCPL Cogeneration Limited
Talisman	Talisman Energy Inc.
Tennessee	Tennessee Gas Pipeline Company
TransCanada	TransCanada PipeLines Limited
Transco	Transcontinental Gas Pipe Line Corp.
TransGas	TransGas Ltd.
U.S.	United States of America
Union	Union Gas Limited
Vector	Vector Energy Inc.
WGML	Western Gas Marketing Limited
WFS	Winter Firm Service
WGSL	Western Gas Services Limited
WIA	Woodlands Improvment Act
Whitby	Whitby Cogeneration Limited Partnership
$\mu g/m^3$	micrograms per cubic metre

Recital and Appearances

IN THE MATTER OF the *National Energy Board Act* ("the Act") and the Regulations made thereunder; and

IN THE MATTER OF an application by TransCanada PipeLines Limited ("TransCanada") pursuant to Part III of the Act for a certificate, pursuant to section 52 of the Act; and

IN THE MATTER OF the National Energy Board Hearing Order No. GH-3-95;

HEARD in Sarnia, Ontario on 2, 3 and 4 October 1995.

BEFORE:

A. Côté-Verhaaf	Presiding Member
R. L. Andrew	Member
J. A. Snider	Member

APPEARANCES:

M.S. Forster J. Gschwendtner	TransCanada PipeLines Limited
L. Strong	Coastal Gas Marketing Company
H.T. Soudek	Consumers' Gas Company Ltd. (The)
F.X. Berkemeier D.A. Moss	Consumers' Power Company
L. G. Keough	Enron Capital & Trade Resources Canada; Morgan Hydrocarbons Inc.
N. Gretener	Northeast Group
D.G. Davies	Renaissance Energy Ltd.
J.S. Bulger	Société en Commandite Gaz Métropolitain
G. Cameron	Union Gas Limited
J.H. Smellie	Westcoast Power Inc.
A. Reid	Alberta Department of Energy
J.C. Turchin	Ontario Minister of Environment and Energy
G. Nettleton	Board Counsel

Overview

(Note: This overview is provided solely for the convenience of the reader and does not constitute part of this Decision or the Reasons, to which readers are referred for detailed text and tables.)

The Application

By application dated 18 April 1995, as amended 8 June 1995 and 18 September 1995, TransCanada applied for a certificate, pursuant to Part III of the Act, to expand its natural gas pipeline system in Saskatchewan, Manitoba and Ontario. In the application, TransCanada sought authorization to construct 295.9 kilometres ("km") of new pipeline loop in the Western and Central Sections, to install three new compressors for a total of 84.9 megawatts ("MW") of new compression, to install two new meter stations, to install manifolding at eight compressor stations, and to provide for standby plants and spares, and the acquisition of two new aero assemblies. The estimated capital cost of the proposed facilities was $489.1 million ($1995).

The proposed expansion would allow TransCanada: to meet projected requirements under existing contracts; to provide for 2 818 10^3m^3/day (99.6 MMcfd) of new Firm Transportation ("FT") from Empress, Alberta of which approximately half would be for export and half for domestic customers; to provide 294 10^6m^3/year (average of 805 10^3m^3/day or 28.4 MMcfd) of increased Firm Service Tendered ("FST"); and to restore the capability that would be lost when relegating the A plants at Stations 92 and 110 to critical standby.

Construction of the applied-for facilities is planned for 1996 with two exceptions, a 6.3 km loop from MLV 20+16.7 km to MLV 21 and manifolding at Station 21, both of which are proposed for construction during 1995. These facilities were considered separately by the Board pursuant to section 58 of the Act and subsequently approved by Order XG-T1-37-95 dated 15 September 1995.

Initially included in the application was a request for approval for the construction of a 0.4 km directionally-drilled crossing of the St. Clair River, referred to as the Dawn Extension. Notification of TransCanada's intent to withdraw this portion of the application, along with the portion of the application concerning a request for 1 416 10^3m^3/day (50 MMcfd) of Long-Term Winter Firm Service ("LT-WFS"), was provided by letter dated 8 September 1995.

Highlights of the Board's Decision

The Board is satisfied that the applied-for facilities are required by the present and future public convenience and necessity and is prepared to issue a certificate subject to the approval of the Governor in Council. The Board determined that the proposed expansion was economically feasible, given that there was a likelihood that the facilities would be used at a reasonable level over their economic life and that the demand charges would be paid. The Board's certificate will include conditions to ensure that only those facilities needed to meet the aggregate firm service requirements will be built, and that construction will occur in an acceptable technical and environmental manner.

Environmental Screening

The Board conducted an environmental screening of the applied-for facilities in compliance with section 18 of the *Canadian Environmental Assessment Act* ("CEAA"). The Board ensured there was no duplication in requirements under the CEAA and the Board's own regulatory process. The Board determined, pursuant to paragraph 20(1)(a) of the CEAA, that taking into account the implementation of TransCanada's proposed mitigative measures and those set out in the attached conditions, the project is not likely to cause significant adverse environmental effects.

Chapter 1

Introduction

1.1 Facilities Application

By application dated 18 April 1995, as amended on 8 June 1995 and 18 September 1995, TransCanada sought a certificate, pursuant to Part III of the Act, to expand its natural gas pipeline system in Saskatchewan, Manitoba and Ontario to meet domestic and export requirements for the contract year commencing 1 November 1996.

The proposed expansion would enable TransCanada to:

(a) meet projected requirements under existing contracts including the continuation of services for Brooklyn Navy Yard Cogeneration Partners, L.P. ("Brooklyn Navy Yard"), Kingston Cogen Limited Partnership ("Kingston CoGen") and Northland Power Iroquois Falls Partnership ("Northland Power") totalling 1 817 $10^3m^3/d$ (64.1 MMcfd) and commencing during the summer of 1996;

(b) provide a total of 2 818 $10^3m^3/d$ (99.6 MMcfd) of new FT from Empress, Alberta, of which 1 417 $10^3m^3/d$ (50.1 MMcfd) would be for customers in Ontario and the remaining 1 401 $10^3m^3/d$ (49.5 MMcfd) would be for service to export customers;

(c) provide 294 10^6m^3/year (an average of 805 $10^3m^3/d$ or 28.4 MMcfd) of increased FST for Union Gas Limited ("Union"); and

(d) restore the capability that would be lost due to the relegation of the A plants at Stations 92 and 110 to critical standby status.

The proposed facilities consist of 295.9 km of pipeline looping, permanent compressor units totalling an ISO rated power output[1] of 84.9 MW and compression related items including two aero assemblies, standby plants and spares, at an estimated capital cost of $489.1 million ($1995). TransCanada estimated that the Eastern Zone toll at 100% load factor in the first full year of service (1997) would be 89.5¢ per gigajoule. Construction of the applied-for facilities is planned for 1996 with two exceptions, a 6.3 km pipeline loop from MLV 20 + 16.7 km to MLV 21 and manifolding at Station 21, both of which were proposed for construction during 1995. These facilities were considered separately by the Board pursuant to section 58 of the Act and subsequently approved by Order XG-T1-37-95, dated 15 September 1995.

The Board held a hearing to examine TransCanada's application on 2, 3 and 4 October 1995, in Sarnia, Ontario.

[1]The rated power at ISO conditions represents unit performances at 15°C, 101.325 kPa and sea level.

1.2 Environmental Screening

The Board conducted an environmental screening of the applied-for facilities in compliance with the CEAA. The Board ensured there was no duplication in requirements under the CEAA and the Board's own regulatory process.

The Board determined that, taking into account the implementation of TransCanada's proposed mitigative measures and those set out in the attached conditions, the project is not likely to cause significant adverse environmental effects. This represents a decision pursuant to paragraph 20(1)(a) of the CEAA.

1.3 Board's Mandate

In considering the application, the Board is required, pursuant to section 52 of the Act, to satisfy itself that the applied-for facilities are and will be required for the present and future public convenience and necessity and shall have regard to all considerations that appear to it to be relevant. Accordingly, the Board examined the following matters related to this application:

a) the long-term availability of gas to the applied-for facilities;

b) the existence of markets and firm transportation requirements to underpin the applied-for facilities;

c) land use, environmental and socio-economic matters;

d) the economic feasibility of the proposed facilities; and

e) the appropriateness of the design of the applied-for facilities considering safety and the efficiency of the pipeline.

The Board's views in respect of each are set out in the following Chapters. A more detailed list of issues is provided in Appendix I.

Chapter 2

Overall Gas Supply/Demand

2.1 Overall Gas Supply

TransCanada relied upon two studies prepared by Sproule Associates Limited ("Sproule") entitled "The Future Natural Gas Supply Capability for the Province of Alberta and the Western Canada Sedimentary Basin 1994 - 2016", dated June 1995, and "Province of Alberta Enhancement to the TCPL Supply Capability Model and the Pool Size Distribution Study", dated April 1994, as evidence of overall gas supply.

The supply capability is based on factors such as demand, price, cost, gas available from existing pools and gas expected to be available from reserve additions, all of which are used to determine drilling activity and returns on investments to the upstream sector.

Sproule concluded that Alberta represents approximately 80 percent of the Western Canadian gas supply and could achieve a productive capacity, from conventional sources of 151 10^9m^3 (5.3 Tcf) per year in 2010, after which production is forecast to decline. This analysis was extrapolated to 181 10^9m^3 (6.4 Tcf) for the Western Canada Sedimentary Basin. The analysis from conventional resources in Alberta indicates that there would be a deficit in annual productive capacity of 25 10^9m^3 (0.9 Tcf), relative to demand, by the end of the forecast period (2016). Sproule provided some background information on coalbed methane, which it expects to be an economic source of supply within 10 to 15 years. Sproule further indicated that some 10 000 coal bed methane wells would be required to meet the projected deficit.

No intervenor expressed concern over Sproule's estimate of supply capability.

Views of the Board

The Board is of the view that conventional supply appears to be adequate for at least the next 12 to 15 years. While forecasting of supply capability is an inherently uncertain task with the range of results presented through the use of sensitivity analyses, the Board is satisfied that TransCanada has demonstrated that there will be sufficient overall gas supply to ensure adequate long-term utilization of TransCanada's system, including the proposed facilities. In future applications, the Board would be interested in more detail concerning alternative sources of natural gas supply.

2.2 Long-term Domestic Markets

TransCanada projected that gas demand in Eastern Canada (Manitoba, Ontario and Québec) will grow at an average annual rate of 1.9 percent over the forecast period, increasing from 1 235 petajoules ("PJs") in 1993 to 1 713 PJs in 2010. TransCanada's evidence indicated that the gap continues to grow between currently contracted capacity on the TransCanada system into the Ontario and Québec markets and the projected requirements in those markets which will require additional facilities beyond those applied for and/or additional U.S. gas imports.

Views of the Board

The Board believes TransCanada's forecast of gas demand for Eastern Canada to be reasonable. The Board notes that no party either challenged TransCanada's forecast, or questioned TransCanada's ability to compete with other gas pipelines in serving those markets.

2.3 Long-term Export Markets

To demonstrate the long-term nature of gas demand in the U.S. Midwest and U.S. Northeast export markets, TransCanada relied on the forecasts prepared by the Gas Research Institute, the WEFA Group and DRI/McGraw Hill. TransCanada noted that these forecasts indicate that annual growth rates for gas demand over the forecast period 1995 to 2010 will range between 0.17 and 1.16 percent in the U.S. Midwest, and between 1.24 and 1.52 percent in the U.S. Northeast. TransCanada concluded that these forecasts demonstrate the existence of long-term U.S. markets and hence, the need for its transportation services.

Views of the Board

The Board is satisfied with TransCanada's evidence regarding the long-term gas demand in the U.S. Midwest and U.S. Northeast markets. The Board notes that no party challenged TransCanada's evidence regarding the ability of Canadian-sourced gas to compete with other gas supply sources in those markets. The Board believes that there is reasonable expectation that shippers will rely on the TransCanada system to meet some of the projected increase in demand in those U.S. markets

Chapter 3

Specific Transportation Services

Requirements

The capacity to be provided by the applied-for facilities is primarily required to allow TransCanada to satisfy the projected requirements under existing transportation service contracts and new firm, domestic and export service requirements.

3.1 TransCanada's Requirements Forecast

TransCanada provided forecasted contractual winter maximum daily and annual deliveries for the contract years commencing 1 November 1994, 1995, and 1996 (refer to Table 3-1). TransCanada submitted that its forecast of winter maximum daily deliveries is based upon its existing transportation service contracts and upon executed or anticipated precedent agreements with prospective shippers. TransCanada's forecast of annual deliveries is based upon survey questionnaire results and upon discussions with existing and prospective shippers. TransCanada's export forecast assumes that existing export licences and contracts will be extended beyond their current expiry dates.

Compared to the requirements forecast filed by TransCanada in its 7 July 1994 revision to its GH-2-94 1995-96 Facilities Application, TransCanada's 1995-96 base case[1] winter maximum daily deliveries increased by 1 500 $10^3m^3/d$ (53.0 MMcfd) reflecting, in part, the non renewal of contracted capacity, requested contract revisions or restructuring, and the addition of new projects. Those changes in deliveries included:

- TransGas Ltd. ("TransGas"), contract reduction of 2 502 $10^3m^3/d$ (88.3 MMcfd);
- Société de Cogénération de Québec, Société en Commandite ("Québec Cogen") service for 765 $10^3m^3/d$ (27.0 MMcfd) removed from the application requirements;
- Gaz Métropolitain and Company L.P., STS contract reduced by 2 975 $10^3m^3/d$ (105.0 MMcfd);
- Western Gas Marketing Limited ("WGML"), FT contract renewed for 4 853 $10^3m^3/d$ (171.3 MMcfd); and
- Three new export services, totalling 977 $10^3m^3/d$ (34.5 MMcfd), commencing 1 November 1995.

[1]Base case requirements include transportation services which are currently available and those for which the facilities necessary to enable the service to commence have been certified.

Table 3-1
TransCanada's Forecast of Winter Maximum Daily and Annual Deliveries [1][2]

(a) Winter Maximum Daily Deliveries

Contract Year	Domestic		Export		Total	
	(10^6m^3)	(MMcf)	(10^6m^3)	(MMcf)	(10^6m^3)	(MMcf)
1994-95	104.5	3 689	96.0	3 389	200.5	7 078
1995-96	100.4	3 544	96.2	3 396	196.6	6 940
1996-97	103.0	3 636	97.3	3 435	200.3	7 071

(b) Annual Deliveries

Contract Year	Domestic		Export		Total	
	(10^9m^3)	(Bcf)	(10^9m^3)	(Bcf)	(10^9m^3)	(Bcf)
1994-95	32.6	1 151	32.5	1 147	65.1	2 298
1995-96	32.9	1 161	33.7	1 190	66.6	2 351
1996-97	34.1	1 204	34.1	1 204	68.2	2 408

[1] Source: TransCanada's 1996-97 Facilities Application, Tab "Requirements", Subtab 1, revised 18 September 1995.

[2] Comprised of FT, STFT, FST, STS, WFS and WGML's Payback Volumes, but excluding all company fuel requirements, losses and other uses.

- CNG Energy Services Corporation, ("CNG") 1 416 $10^3m^3/d$ (50.0 MMcfd) of new LT-WFS commencing 1 November 1995[1].

TransCanada indicated that its base case requirements forecast is reasonable, that the forecast will be updated as more current information becomes available, and that it will make any adjustments at the time the "Release for Construction" application is filed with the Board.

3.2 New Domestic Services

The applied-for facilities are supported by six domestic shippers who have requested incremental service totalling 2 222.0 $10^3m^3/d$ (78.5 MMcfd), or 61 percent of the total new firm services. (refer to Table 3-2).

3.2.1 TCPL Cogeneration Limited (Kapuskasing)

TCPL Cogeneration Limited ("TCPL Cogeneration") has executed a twenty-year Precedent Agreement with TransCanada, dated 7 March 1995, for the delivery of 215.0 $10^3m^3/d$ (7.6 MMcfd) of gas, commencing 1 November 1996. The gas will be shipped from Empress, Alberta to the point of interconnection between the pipeline facilities of TransCanada and Centra Gas Ontario, Inc. ("Centra Gas") near Kapuskasing, Ontario.

The gas will be used to fuel a 40 MW natural gas-fired, combined cycle power generating facility to be constructed at TransCanada's Compressor Station 95 near Kapuskasing, Ontario.

The electricity produced by the facility will be sold by TransCanada to Ontario Hydro in accordance with a twenty-year Power Purchase Agreement dated 1 February 1994, which received Lieutenant-Governor in Council approval on 6 April 1994.

Upstream transportation on NOVA Corporation of Alberta ("NOVA") will be contracted for by WGML. Downstream transportation will be provided by Centra Gas.

Gas supply arrangements for the shipper, TCPL Cogeneration, are supported by a Gas Sales Contract between WGML and TransCanada dated 28 January 1994. WGML provided a corporate supply and demand balance indicating sufficient supply will be available from existing contracted lands to meet projected annual requirements.

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[1]Refer to RH-3-94, Reasons for Decision, TransCanada PipeLines Limited, March 1995, section 9.3, "Long-Term Winter Firm Service (LT-WFS)".

Table 3-2
New Firm Services Associated with TransCanada's 1996-97 Facilities Application

	Commencement Date[1]	Type of Service	Delivery Point	Term (Years)	Volume[1] ($10^3m^3/d$)	Volume[1] (MMcfd)
Domestic						
TCPL Cogeneration Ltd. Kapuskasing	1/11/96	FT	NDA	20	215.0	7.6
TCPL Cogeneration Ltd./North Bay	1/11/96	FT	NDA	20	215.0	7.6
The Consumers' Gas Company Ltd.	1/11/96	FT	EDA	10	283.0	10.0
Union Gas Limited	1/11/96	FT	CDA	10	350.0	12.4
Union Gas Limited[2]	1/11/96	FST	CDA	10	805.0	28.4
Whitby Cogeneration Limited Partnership	31/12/96	FT	CDA	15	354.0	12.5
Total Domestic					**2 222.0**	**78.5**
Export						
Altresco Pittsfield, L.P.	1/4/96	FT	Niagara Falls	14	609.0	21.5
Renaissance Energy Ltd.	1/4/96	FT	Niagara Falls	10	85.0	3.0
Coastal Gas Marketing Canada	1/4/96	FT	Iroquois	10	283.3	10.0
Enron Gas Marketing Inc.	1/11/96	FT	Iroquois	10	423.7	15.0
Total Export					**1 401.0**	**49.5**
Total Domestic and Export					**3 623.0**	**128.0**

[1] Commencement Date and Volume in accordance with the Precedent Agreements between TransCanada and the shippers.

[2] Union's FST for 294 10^6m^3/year or a daily average of 805 10^3m^3.

3.2.2 TCPL Cogeneration Limited (North Bay)

TCPL Cogeneration has executed a twenty-year Precedent Agreement with TransCanada, dated 7 March 1995, for the delivery of 215.0 $10^3m^3/d$ (7.6 MMcfd) of gas, commencing 1 November 1996. The gas will be shipped from Empress, Alberta to the point of interconnection between the pipeline facilities of TransCanada and Centra Gas near North Bay, Ontario.

The gas will be used to fuel a 40 MW natural gas-fired, combined cycle power generating facility to be constructed at TransCanada's Compressor Station 116 near North Bay, Ontario.

The electricity produced by the facility will be sold by TransCanada to Ontario Hydro in accordance with a twenty-year Power Purchase Agreement dated 1 February 1994, which received Lieutenant-Governor in Council approval on 6 April 1994.

Upstream transportation on NOVA will be contracted for by WGML. Downstream transportation will be provided by Centra Gas.

Gas supply arrangements for the shipper, TCPL Cogeneration, are supported by a Gas Sales Contract between WGML and TransCanada dated 28 January 1994. WGML provided a corporate supply and demand balance indicating sufficient supply will be available from existing contracted lands to meet projected annual requirements.

3.2.3 The Consumers' Gas Company Ltd.

The Consumers' Gas Company Ltd. ("Consumers'") has executed a ten-year Precedent Agreement with TransCanada, dated 15 February 1995, for the delivery of 283.0 $10^3m^3/d$ (10.0 MMcfd) of gas from Alberta and Saskatchewan to Consumers' franchise area. Consumers' has requested the additional service, commencing 1 November 1996, to serve normal market growth in its franchise area.

Upstream transportation on NOVA and TransGas will be contracted for by Consumers' gas suppliers.

Consumers' supply portfolio consists of short, medium and long-term gas contracts mainly with Western Canadian suppliers. Consumers' submitted a summary corporate supply and demand balance for the years 1996-97 through to 2000-01. As of 1 November 1994, Consumers' had 6 444 $10^3m^3/d$ (228 MMcfd) under long-term contract with nine Western Canadian suppliers. Consumers' has another 6 189 $10^3m^3/d$ (219 MMcfd) under contract with WGML. Gas supplies in support of the applied-for FT capacity will be drawn initially from the daily volume flexibility within Consumers' current gas supply portfolio. Additional supply will be contracted, as required, through its competitive bidding process. Consumers' request for service of 283 $10^3m^3/d$ (10 MMcfd) represents an increase in demand of one percent.

3.2.4 Union Gas Limited

3.2.4.1 Firm Transportation Service

Union has executed a ten-year Precedent Agreement with TransCanada, dated 24 March 1995, for the delivery of 350 $10^3m^3/d$ (12.4 MMcfd) of gas from Alberta and Saskatchewan to Union's franchise area. The additional service will be used to serve normal market growth in its franchise area.

Upstream transportation on NOVA and TransGas will be contracted for by each of Union's gas suppliers.

Union's supply portfolio consists of short, medium and long-term gas contracts with various suppliers. Union submitted a summary corporate supply and demand balance for fiscal years 1995 through 1999. The 1995 demand of 18 698 $10^3m^3/d$ (660 MMcfd) compares with a total supply of 19 027 $10^3m^3/d$ (672 MMcfd). Union's request for service of 350 $10^3m^3/d$ (12.4 MMcfd) represents an increase in demand of two percent.

3.2.4.2 Firm Service Tendered

On 30 May 1994, Union elected to reduce its FST Annual Contract Quantity ("ACQ") by 10 percent in accordance with the provisions of Union's existing FST contract with TransCanada and with the provisions of TransCanada's FST Toll Schedule, section 2.3. On 1 May 1995, Union advised TransCanada that it would be reverting back to 100 percent of the ACQ under the FST contract.

To enable TransCanada to meet its projected aggregate requirements, including Union's FST at 100 percent of Union's contractual entitlement, TransCanada requires 805.0 $10^3m^3/d$ (28.4 MMcfd) of incremental capacity.

3.2.5 Whitby Cogeneration Limited Partnership

Whitby Cogeneration Limited Partnership ("Whitby") has executed a fifteen-year Precedent Agreement with TransCanada, dated 19 May 1995, for the delivery of 354.0 $10^3m^3/d$ (12.5 MMcfd) of gas, commencing 31 December 1996. The gas will be shipped from Alberta and Saskatchewan to the points of interconnection between the pipeline facilities of TransCanada and Consumers' at the Pickering and Oshawa Gate Stations.

Whitby is a limited partnership made up of Westcoast Power Inc. and Atlantic Packaging Products Ltd. ("Atlantic").

The gas will be used to fuel a 50 MW gas-fired, combined cycle cogeneration power plant to be constructed in Whitby, Ontario adjacent to a paper recycling mill owned by Atlantic. The facility is scheduled to be commissioned in the fall of 1996 and to be fully operational by 31 December 1996.

All of the electric output from the cogeneration facility will be sold to Ontario Hydro in accordance with an executed, twenty-year Power Purchase Agreement, dated 31 March 1994, entered into between Whitby and Ontario Hydro. Lieutenant-Governor in Council approval for the purchase of the electric power was received on 2 June 1994.

The resulting thermal power will be sold to Atlantic for its paper recycling operations in accordance with an executed Restated Steam Sales Agreement, dated 27 April 1994, entered into between Whitby and Atlantic.

Upstream transportation on NOVA is to be contracted for by Western Gas Services Limited ("WGSL"), a subsidiary of WGML. Downstream transportation on the Consumers' system is to be contracted for by Whitby. Downstream pipeline capacity is to be constructed prior to 1 October 1996.

Whitby has entered into a Gas Sales Agreement with WGSL dated 31 March 1994. Further to that agreement is a Gas Supply Agreement between WGSL and Shell Canada Limited ("Shell") to provide the required volumes for Whitby. The agreement between WGSL and Whitby is currently being amended and is expected to reflect an increase in Daily Contract Quantity ("DCQ") from 210 $10^3m^3/d$ (7.4 MMcfd) to 354 $10^3m^3/d$ (12.5 MMcfd). WGSL provided a corporate supply and demand balance based upon the increased DCQ and Shell's reserves in the Harmatton East Unit No.1 and Harmatton Elkton Unit No.1. The information shows that WGSL's supply is greater than demand over a 12 year period.

3.3 New Export Services

The applied-for facilities are also supported by four export shippers who have requested service totalling 1 401.0 $10^3m^3/d$ (49.5 MMcfd), or 39 percent of the total new firm service requirements. (refer to Table 3-2).

3.3.1 Altresco Pittsfield, L.P.

Altresco Pittsfield, L.P. ("Altresco") has executed a fourteen-year Precedent Agreement with TransCanada, dated 19 May 1995, for the delivery of 609.0 $10^3m^3/d$ (21.5 MMcfd) of gas from Alberta and Saskatchewan to the Niagara Falls, Ontario export point commencing 1 April 1996.

The gas will be used to supply Altresco's existing 160 MW gas turbine cogeneration facility located in Pittsfield, Massachusetts. The facility has been in operation since 1990 and has a total daily gas requirement of 892.3 $10^3m^3/d$ (31.5 MMcfd).

The Altresco facility originally underpinned the TransCanada facilities approved by the Board following the GH-4-88 proceedings. At that time, Vector Energy Inc. ("Vector"), as agent to a number of gas producers, was to hold FT service on the TransCanada system. Effective 1 November 1993, the producer group and Vector terminated the gas supply arrangements for approximately 637.4 $10^3m^3/d$ (22.5 MMcfd). This supply has been replaced under temporary arrangements with New England Power which terminate on 31 October 1995. The remaining producers, representing 255.0 $10^3m^3/d$ (9.0 MMcfd), are continuing to supply Altresco for the period 1 November 1993 to 31 October 1995.

For the period 1 November 1995 to 31 March 1996, Altresco contemplates entering into a short-term FT agreement with TransCanada for 609.0 $10^3m^3/d$ (21.5 MMcfd), after which long-term TransCanada service will be provided in accordance with the aforementioned Precedent Agreement. For the remaining 283.3 $10^3m^3/d$ (10.0 MMcfd), Altresco is in the process of negotiating an assignment of existing FT capacity held by its current suppliers.

The electrical output of the cogeneration facility is being sold under long-term Power Sale Agreements entered into between Altresco and Cambridge Electric Light Company, Commonwealth Electric Company, and Massachusetts Electric Company. The thermal energy is being sold to General Electric Company ("General Electric") in accordance with a contract for the Purchase and Sale of Steam Energy dated 25 April 1988. The thermal energy is being used by General Electric in the manufacturing of electrical equipment.

Upstream transportation on NOVA has been contracted for by Talisman Energy Inc. ("Talisman") and Home Oil Company Ltd., the gas suppliers to the Altresco export sale.

Downstream transportation on the Tennessee Gas Pipeline Company ("Tennessee") pipeline system has been contracted for by Altresco in accordance with an executed twenty-year Firm Natural Gas Transportation Agreement dated 30 September 1991. Downstream transportation from the Tennessee system to the Pittsfield cogeneration facility will be provided in accordance with an executed Natural Gas Transportation Agreement, dated 15 March 1989, entered into between Altresco and the Berkshire Gas Company.

An executed Natural Gas Purchase and Sales Agreement dated 23 August 1995, between Altresco and Talisman forms the basis of a long-term firm gas supply contract between the parties. This agreement provides for volumes of 635.1 $10^3m^3/d$ (22.4 MMcfd). The reserves underpinning the contract are based upon Alberta Energy Utilities Board ("EUB") reserves under control listings. The EUB reserves estimates totalled 21 375 $10^6\ m^3$ compared to total market commitments of 11 552 $10^6\ m^3$ referenced to 1 January 1995.

3.3.2 Renaissance Energy Ltd.

Renaissance Energy Ltd. ("Renaissance") has executed a ten-year Precedent Agreement with TransCanada, dated 15 May 1995, for the delivery of 85.0 $10^3m^3/d$ (3.0 MMcfd) of gas from Alberta to the Niagara Falls, Ontario export point. Service under the Precedent Agreement is to commence 1 April 1996 and is in conjunction with a Short-Term Firm Transportation ("STFT") service contract with TransCanada for the period 1 November 1995 to 31 March 1996.

The gas will be delivered to Delmarva Power & Light Company ("Delmarva"), a gas and electric utility company serving the State of Delaware. The gas, which will be used by Delmarva to meet anticipated growth in its gas market area, represents Delmarva's first purchase of Canadian gas. The sale will take place in accordance with a Gas Purchase Contract, dated 7 June 1994, entered into between Renaissance Energy (U.S.) Inc. and Delmarva.

Upstream transportation on NOVA has been contracted for by Renaissance. Downstream, Delmarva has entered into a Firm Transportation Service Agreement with National Fuel Gas Supply Corporation, dated 29 December 1993, for the delivery of the gas to the point of interconnection of the facilities of Transcontinental Gas Pipe Line Corp. ("Transco"). Delmarva has entered into a Firm Gas Transportation Agreement for Storage Gas, dated 1 November 1985, with Transco for the delivery of the gas to Delmarva, Delaware.

Gas supply contracts for Delmarva have been executed with Renaissance. The gas supply arrangements were reviewed in detail during the recent GH-1-95 gas export hearing. The supply information submitted in that proceeding was found to be adequate for the project.

3.3.3 Coastal Gas Marketing Company

Coastal Gas Marketing Company ("CGM") has executed a ten-year Precedent Agreement with TransCanada, dated 19 May 1995, for the delivery of 283.3 $10^3m^3/d$ (10.0 MMcfd) of gas from Empress, Alberta to the Iroquois, Ontario export point. Service under the Precedent Agreement is to commence 1 April 1996 and is in conjunction with a STFT service contract with TransCanada for the period 1 November 1995 to 31 March 1996.

The gas will be used to supply a number of existing markets in the U.S. Northeast served by CGM, including the Eagle Point refinery and cogeneration facility at Westville, N.J. owned by Coastal Corporation, the parent company of CGM.

Upstream transportation on NOVA has been contracted for by Morgan Hydrocarbons Inc. ("Morgan"), the gas supplier to the CGM export sale.

Downstream transportation on the Iroquois Gas Transmission System, L.P. ("Iroquois") pipeline system to South Commack, N.Y. has been contracted for by CGM in accordance with a Precedent Agreement dated 2 May 1995. To effect delivery from South Commack, N.Y., CGM has entered into a Capacity Exchange with Transco in accordance with which CGM's gas will be delivered to Westville, N.J. using the Transco and Long Island Lighting Company ("LILCO") pipeline facilities.

The shipper, CGM, has made gas supply arrangements through a letter agreement with Morgan dated 14 October 1994. The substance of this letter agreement was examined during the hearing, and it was noted that a more comprehensive contract would be executed some time in the near future.

Morgan submitted a non-dedicated supply portfolio with a corporate warranty to deliver 283.3 $10^3m^3/d$ (10 MMcfd) plus fuel. CGM indicated that the strength of the corporate warranty is an important aspect of the gas supply arrangement. However, neither Morgan nor CGM provided an aggregate supply and demand balance.

In argument, CGM and Morgan indicated that, while they may not have submitted an aggregate supply and demand balance, the non-dedicated project specific supply information was adequate to support the service request. CGM also argued that, as a large gas marketing company, it was prepared to fulfil the obligation to pay demand charges under the TransCanada agreement. If, for any reason, Morgan does not deliver sufficient gas, Morgan's corporate warranty indemnifies CGM for all incremental costs in acquiring replacement volumes. In addition, CGM has the option to seek alternative supplies if the need should arise.

3.3.4 Enron Capital and Trade Resources Canada Corp.

Enron Capital and Trade Resources Canada Corp. ("ECT Canada") has executed a ten-year Precedent Agreement with TransCanada, dated 19 May 1995, for the delivery of 423.7 $10^3m^3/d$ (15.0 MMcfd) of gas from Empress, Alberta to the Iroquois, Ontario export point commencing 1 November 1996.

The gas will be sold by ECT Canada to Enron Capital and Trade Resources Corp. ("ECTR") on the Canadian side of international boundary at Iroquois, Ontario and used by ECTR to supply two local distribution companies and three cogeneration facilities in the U.S. Northeast under existing long-term gas sales contracts. The Canadian-sourced gas will be used to displace U.S.-sourced gas in ECTR's gas supply portfolio.

Upstream transportation on NOVA has been contracted for by the three gas producers supplying gas to the ECT Canada export sale.

Downstream transportation on the Iroquois pipeline system to South Commack, N. Y. has been contracted for by ECTR in accordance with a Precedent Agreement dated 1 April 1995. To effect

delivery to its U.S. Northeast markets off the Iroquois system, ECTR will use, among others, existing transportation arrangements it holds with LILCO, Tennessee and Transco.

Gas supply arrangements have been made with Conwest Exploration Company Limited ("Conwest"), Czar Resources Ltd. ("Czar") and Orbit Oil & Gas Ltd. ("Orbit") for volumes of 283.3 $10^3m^3/d$ (10 MMcfd), 85 $10^3m^3/d$ (3 MMcfd) and 57 $10^3m^3/d$ (2 MMcfd), respectively. Confirmation letters representing the gas sales agreements were executed in April 1995 for each of Conwest, Czar, and Orbit.

Conwest submitted detailed reserves information based upon a third party analysis which showed a surplus of corporate reserves over long-term commitments.

Czar and Orbit submitted corporate supply and demand balance information as well as data for uncommitted reserves. For each company, the corporate supply and demand balance showed a surplus of proven reserves over corporate long-term commitments. For both companies, the uncommitted gas volumes were equal to or greater than the project term volumes.

Views of the Board

The Board finds TransCanada's requirement forecasts to be reasonable for the purpose of assessing TransCanada's facilities requirements for the 1996-97 contract year. In addition, the Board is satisfied that the new domestic and export transportation projects are sufficiently advanced with respect to gas supply, upstream and downstream transportation arrangements, gas purchase and gas sales arrangements, and with respect to securing Canadian and U.S. regulatory approvals, to support TransCanada's facilities design. The Board believes that there is a reasonable expectation that all remaining contractual arrangements and regulatory approvals can be finalized in a timely manner to allow those services to commence as anticipated.

The Board is satisfied with TransCanada's forecasting methodologies and its approach to independent verification of the information furnished by prospective shippers. However, to ensure that the applied-for facilities, if certificated, are used and useful over the long term, the Board believes that it would be appropriate to condition any certificate requiring TransCanada, prior to the commencement of construction, to:

- demonstrate that, with respect to the new firm export services, all necessary U.S. and Canadian federal regulatory approvals, including applicable long-term Canadian export authorizations have been granted;

- demonstrate that, with respect to the transportation services of new firm volumes, the transportation service contracts have been executed;

- demonstrate that, with respect to the transportation services of new firm volumes, all necessary U.S. and Canadian regulatory approvals have been received for any required downstream facilities or transportation services;

- demonstrate that, with respect to the transportation services of new firm volumes, gas supply contracts have been executed; and

- identify any changes to TransCanada's base case requirements and the requirements for which the applied-for facilities are required.

The Board is satisfied that the aforementioned certificate conditions will ensure that only firm aggregate requirements underpin the construction of new facilities.

The Board finds that TransCanada has provided the required information on project specific gas supply for shippers requesting new FT service.

Consistent with the views expressed in the GHW-3-89 Reasons for Decision and for the purposes of this application, the Board does not require detailed gas supply information in support of Consumers' and Union's services since these requests result from normal market growth within their franchise areas.

The Board is of the view that the extent of information submitted by CGM and Morgan raises questions as to the adequacy of supply and the enforceability of the gas sales letter agreement. However, supply and contractual arrangements will be examined further in the GH-4-95 gas export hearing.

Taking into account the specific qualifications and conditions noted above, the Board is satisfied with the gas supply arrangements outlined for domestic and export shippers.

Chapter 4

Facilities

4.1 Specific Facilities

The facilities included in TransCanada's application[1] and considered in the GH-3-95 proceeding consist of 289.6 km of pipeline looping, the installation of permanent compressor units totalling 84.9 MW (ISO), manifolding at Stations 30, 43, 45, 60, 69, 80 and 102, the installation of the Kapuskasing Power and North Bay Power Meter Stations, standby plants and spares, and two new aero assemblies.

Details and costs of these facilities are provided in Figure 4-1 and Table 4-1. The total capital cost of the facilities is estimated at $481.6 million ($1995). TransCanada submitted that the proposed facilities are required by the present and future public convenience and necessity.

The applied-for facilities include three new 28.3 MW compressor units at Station 17, Station 92 and Station 110. TransCanada proposed the installation of a new electric motor driven compressor package at Compressor Station 17. The selection of an electric unit was justified on the basis of favourable power rates set out in a ten-year electric power agreement with TransCanada Northridge Power Ltd. ("TCNP") and SaskPower. Through the involvement of TCNP in the contractual arrangement, SaskPower obtained some assurances that it would be covered for some financial force majeure risks that they saw in providing power at 35% less than their published rates.

TransCanada indicated that a new unit at Station 92 would allow the A plant at this station to be placed on critical standby, thereby eliminating the need to perform any major overhauls or the installation of low oxides of nitrogen ("NO_X") combustion systems. As a result of a major mechanical failure at the A2 unit at Station 110 in November 1994, and TransCanada's inability to obtain appropriate parts for repair, TransCanada proposed to relegate both the A1 and A2 units at this station to critical standby. This is consistent with TransCanada's plan to retire all of the Westinghouse units on its system for reasons of age, obsolescence and high noise levels.

By letter dated 29 September 1995, TransCanada requested that certain facilities be exempt from proposed certificate conditions commonly referred to as release conditions which are normally included in certificates issued to TransCanada. These release conditions ensure that only firm transportation requirements underpin the construction of new facilities. The release conditions specify that TransCanada must file, prior to construction: information demonstrating that all necessary United States and Canadian federal regulatory authorizations applicable to new firm export volumes have been granted; information demonstrating that, for new firm volumes on the TransCanada system, transportation contracts have been executed, all necessary regulatory approvals have been granted for downstream facilities or transportation services and that gas supply contracts supporting the new firm

[1] In its amended application dated 8 June 1995 TransCanada applied for approval to construct 296.3 km of looped pipeline. TransCanada subsequently withdrew the St. Clair River Crossing and received approval pursuant to section 58 of the Act, by Order XG-T1-37-95 dated 15 September 1995, for the 6.3 km Grenfell Loop and manifolding at Station 21. These revisions, plus a revised cost estimate for Compressor Station 17, are reflected in the $481.6 million revised cost estimate for the applied-for facilities.

volumes have been executed; and, requirements tables and flow schematics which demonstrate the need for the construction of the facilities.

TransCanada submitted that the updates to its base case requirements filed with its request for exemption respecting the Kingston Cogen project, the Northland Power project and the Brooklyn Navy Yard project, along with information filed previously in Hearing GH-2-94 and in its 1995 Facilities Release and Section 58 Application, dated 2 March 1995, satisfied the release conditions for certain Western Section pipeline loops ("Base Case facilities").

As it had previously noted in its application, TransCanada also identified certain pipeline loop facilities which could not be practically constructed in the summer due to the presence of muskeg, swampy terrain and high water tables, or which would result in greater impact to the environment if constructed in the summer ("Winter Looping facilities"). In support of its request for an exemption from the release conditions for the Winter Looping facilities, TransCanada submitted executed firm service transportation contracts for the TCPL Cogeneration (Kapuskasing), TCPL Cogeneration (North Bay) projects and for Union.

The Base Case and Winter Looping facilities are set out in Table 4-2.

Views of the Board

The Board is of the view that the system requirements justify the installation of the proposed facilities. Based on previous experience, the Board will continue to condition the certificate to ensure that only firm transportation requirements underpin the construction of facilities. The Board is also of the view that TransCanada's request, for an exemption from the release conditions for the Base Case facilities and the Winter Looping facilities listed in Table 4-2, is reasonable.

4.2 Central Section versus Great Lakes Expansion

In deciding whether to expand its Central Section or the Great Lakes Transmission Limited Partnership ("Great Lakes") system, TransCanada used a computer model called OPTO to determine the least cost method of expanding facilities on the Central Section. OPTO generates feasible design alternatives and selects incremental facilities to meet the corresponding incremental market requirements. OPTO was also used to confirm the selection of facilities recommended by Great Lakes for an equivalent increase in capacity on its system. In each case, TransCanada calculated the capital cost of each expansion alternative as well as the annual owning and operating cost ("AOOC"). TransCanada then weighed the AOOC and the capital costs for each alternative to determine the least cost scenario.

Table 4-1
Description and Estimated Cost of the Applied-for Facilities

Line	Loop Description	Length (km)	Direct Cost (1995 base) ($000)
Western Section			
100-6	MLV 12 to MLV 13	26.4	24 830
100-6	MLV 23 to MLV 24	24.8	25 065
100-6	MLV 24 to MLV 25	27.6	29 483
100-6	MLV 29 to MLV 30	25.2	25 477
100-6	MLV 32 to MLV 33	27.1	26 752
100-6	MLV 33 to MLV 34	27.0	28 720
Central Section			
100-4	MLV 41 + 12.0 km to MLV 42	18.3	21 484
100-4	MLV 43 to MLV 43 + 5.5 km	5.5	9 443
100-4	MLV 45 to MLV 46	19.1	29 633
100-4	MLV 46 to MLV 46 + 5.6 km	5.6	8 792
100-4	MLV 59 to MLV 60	31.6	38 649
100-4	MLV 69 to MLV 71	25.7	34 351
100-4	MLV 71 to MLV 71 + 5.8 km	5.8	8 415
100-4	MLV 80 to MLV 80 + 13.8 km	13.8	20 151
100-4	MLV 102 to MLV 102 + 6.1 km	6.1	9 562
	Total Looping	289.6	340 807

Compressor Plant Additions and Piping Modifications	Power	Direct Cost (1995 base) ($000)
Station 17	28.3 MW (ISO)	27 003
Station 92	28.3 MW (ISO)	25 828
Station 110	28.3 MW (ISO)	26 044
Manifolding at Station 30, 43 and 45		3 790
Manifolding at Station 60, 69, 80 and 102		6 453
Meter Station - Kapuskasing Power		494
Meter Station - North Bay Power		547
2 Aero Assemblies		6 029
Standby Plant and Spares		8 223
Total Compression		104 411
Total Direct Costs		445 218
Associated Indirect Costs		36 378
Total Capital Costs		481 596

Figure 4-1
TransCanada PipeLines Limited
Location of the Applied-for Facilities

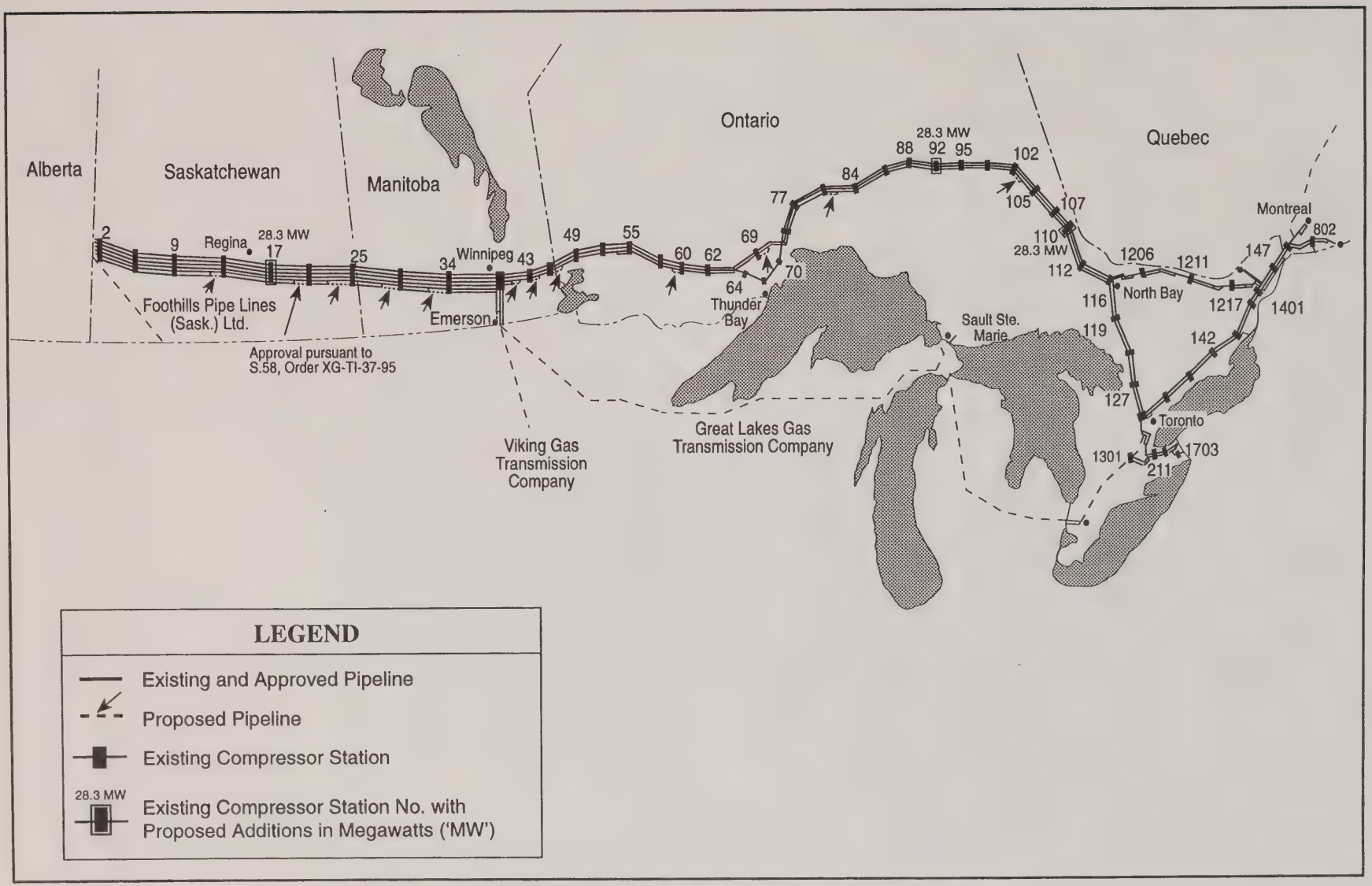

Table 4-2
Facilities Included in TransCanada's
Request for Exemption From Release Conditions

Pipeline Loop Facilities

Location	Loop Name	Construction Start Date
1.1 km from MLV 29+14.4 km to MLV 29+15.5 km[1]	Lake Wahtopanah	December 1995
24.8 km from MLV 23 to MLV 24[2]	Wapella	June 1996
24.1 km from MLV 29 to MLV 30*[2]	Rapid City	June 1996
5.5 km from MLV 43 to MLV 43+5.5 km[3]	Spruce	December 1995
19.1 km from MLV 45 to MLV 46[3]	Camp Lake	December 1995
5.6 km from MLV 46 to MLV 46+5.6 km[3]	Clearwater Bay	December 1995
25.7 km from MLV 69 to MLV 71[3]	Thunder Bay East	December 1995
5.8 km from MLV 71 to MLV 71+5.8 km[3]	Seagull	December 1995
13.8 km from MLV 80 to MLV 80+13.8 km[3]	Geraldton	December 1995
6.1 km from MLV 102 to MLV 102+6.1 km[3]	Cochrane	December 1995

* Excludes the 1.1 km Lake Wahtopanah Loop.

Compression Facilities

Location
Manifolding at Station 30[2]
Manifolding at Stations 43, 45, 69, 80 and 102[3]

[1]Facilities Needed to Serve Base Case Requirements and Requested to be Released for Winter Construction.

[2]Facilities Needed to Serve Base Case Requirements.

[3]Release of Facilities for Winter Construction.

TransCanada analyzed the alternatives from both short and long-term perspectives. In the short-term analysis, an expansion of 1.558 $10^6m^3/d$ (55 MMcfd) in 1996-97 was considered for two cases: Case 1 in which all gas moves through the Central Section; and Case 2 in which all gas moves through the Great Lakes system. TransCanada indicated that the Central Section route had both lower capital costs and AOOC. In the long-term analysis, the assumed total volume of expansion was 14.168 $10^6m^3/d$ (500 MMcfd) over the next three years. In addition to the two cases considered for the short-term, the long-term analysis included a third case in which gas was assumed to move on an equal volumetric basis through both the Central Section and Great Lakes routes. TransCanada indicated that the Central Section route again exhibited both lower capital costs and AOOC, leading TransCanada to conclude that expanding solely on the Central Section was the preferred alternative.

While expressing overall support for the application, Union argued that the consideration of the flow-split issue by TransCanada did not demonstrate the level of rigour or thoroughness that would be expected to characterize the analysis underlying decisions with such financial implications.

In response, TransCanada reiterated that it performs the flow-split analysis on both a short-term and a long-term basis for different cases and that it also carries out various sensitivities on many different economic and financial parameters. TransCanada noted that Union had not made information requests to TransCanada nor did it cross-examine witnesses on the matter of flow-split analysis at the hearing. TransCanada further submitted that the information on the record proved that its flow-split analysis had been rigorously employed.

Views of the Board

The Board is of the view that the proposed facilities represent an appropriate design for an expansion of the TransCanada system at this time. Although the Board accepts TransCanada's supporting evidence, including its discussion of the results of the OPTO analysis in the current proceedings, the Board is concerned that the level of detail, presented in the application, may not demonstrate a sufficiently rigourous analysis. The Board is of the view that, given the magnitude of the investment that is typically involved, all assumptions, forecasts and factors which have a bearing on the result should be clearly described and, if applicable, justified. This would include assumptions related to interest and exchange rate forecasts and factors such as the use of normalized and flow-through taxes by the different companies involved. In addition, the results of any sensitivity analysis should be provided in order to demonstrate the robustness of the analysis. The Board directs TransCanada to provide this information in its subsequent applications.

Chapter 5

Land Use, Environmental and Socio-Economic Matters

5.1 Assessment and Notification Process

5.1.1 Assessment Process

TransCanada submitted Environmental and Socio-Economic Assessment reports ("the assessments") under covering letters dated 18 April, 8 June and 22 September 1995 in support of its application. In addition, TransCanada has adopted the recommendations contained in those assessments to prevent or mitigate any adverse environmental effects resulting from the construction and operation of the applied-for facilities. TransCanada has also undertaken to adhere to the policy statements, mitigative measures and procedures provided in its Pipeline Construction Specifications (April 1993) and in its Environmental Management Handbook (1995).

The assessments included a description of the environmental setting, an assessment of the probable adverse environmental effects of the proposal, the effects of malfunctions or accidents, recommendations to prevent or mitigate any adverse environmental effects resulting from the applied-for facilities, and an assessment of the cumulative and residual effects of its proposal, which could accumulate or interact with the environmental effects of other projects that have been or will be carried out. An Environmental Issues List ("EIL"), which included the recommended practices and procedures to prevent or mitigate specific adverse environmental effects, was provided for each of the proposed pipeline loops. TransCanada has undertaken to file with the Board, prior to construction, updates to all EILs in order that they include all changes resulting from undertakings made to government agencies or as otherwise adduced in evidence in Hearing GH-3-95.

TransCanada indicated that as it is difficult to anticipate site conditions during construction, where possible, options for mitigation have been presented in its assessments. All options presented are viable methods to mitigate construction operations, however, the necessity and applicability of each method is based on site conditions. Mitigation alternatives have been provided so that the most suitable option can be selected based on the site conditions at the time of construction. TransCanada also indicated that the selection of the appropriate mitigative technique from the alternatives specified in its assessments will be made in consultation with the Environmental Inspector for the loop and the Environmental Analyst. It is recommended that the most appropriate mitigative technique will be selected at the time of construction on a site specific basis.

Fisheries Resource Assessments for all looping facilities included in this Application, as well as Rare and Endangered Plant Surveys, Wildlife Surveys, and Heritage Resources Surveys for the Western Section facilities, were prepared and filed at the opening of the oral portion of the hearing. These reports are responsive, in a number of cases, to questions and concerns raised by specialist agencies providing advice to the Board and by parties responding to TransCanada's consultation program.

The environmental and directly-related social effects of the project were considered concurrently under two separate processes:

(i) an examination of the project pursuant to the Board's mandate under Part III of the Act; and

(ii) an environmental screening of the application pursuant to section 18 of the CEAA.

The environmental screening was conducted following the oral portion of the hearing pursuant to the Board's Directions on Procedure dated 27 June 1995. The Board's environmental review pursuant to Part III of the Act is detailed in this chapter.

5.1.2 Early Public Notification

In accordance with the Board's Guidelines for Filing Requirements, TransCanada initiated its early public notification ("EPN") program in respect of the 1996-97 Facilities Application on 16 December 1994. As customer demand for transportation services increased, seven new projects were added to TransCanada's proposed facilities list. As a result, TransCanada launched the second phase of the EPN program on 10 April 1995. The EPN program included meetings, notifications placed in local newspapers, and correspondence with landowners, municipalities, provincial and federal government agencies and departments, provincial and federal elected officials, and various public interest groups. Advertisements were placed in 45 different newspapers for the initial EPN program. The second set of proposed facilities was advertised in 23 local newspapers. During both phases of the EPN program, 799 individuals, organizations and government agencies received letters outlining TransCanada's proposed plans and seeking comments on the potential environmental and socio-economic impacts of the proposed construction. TransCanada is continuing to consult with interested parties and will address public concerns on an ongoing basis. The Environmental Impact Assessments ("EIA") for the first phase of the program were mailed to interested parties the week of 22 May 1995; and the EIAs for the second phase were distributed at the beginning of July 1995.

The Board directed TransCanada to publish a Notice of Public Hearing, which was published in newspapers in Saskatchewan, Manitoba and Ontario.

TransCanada provided the Board with summary tables listing the letters received during the notification process. These tables included a statement summarizing the sender's concerns and any action TransCanada undertook in response to the letters and inquiries received. At the request of the Board, TransCanada filed copies of all letters received and responses from TransCanada. The Board also requested an additional summary which provided greater detail regarding the concerns raised by government agencies and public interest groups. This summary included all environmental, land use or socio-economic recommendations or requirements of the above-mentioned agencies or groups, and provided explanations for any recommendations with which TransCanada did not agree.

Pursuant to section 12(3) of the CEAA, the Board sent a Request for specialist advice to Environment Canada (Saskatchewan, Manitoba and Northern Ontario Areas) and the Department of Fisheries and Oceans ("DFO") (Saskatchewan, Manitoba and Northern Ontario Areas) dated 20 July 1995, regarding the potential effects of the proposal on areas of Environment Canada responsibility and DFO responsibility.

Public Concerns

As a result of its EPN program, TransCanada has received 100 queries. The following summarizes the queries received during the 1996-97 EPN program:

- 14 queries requesting general expansion information, i.e. location, procedure, timing;
- 34 of the respondents acknowledged TransCanada's letter;
- 13 requested information on employment and business opportunities;
- 10 respondents requested an EIA;
- 36 respondents had a specific information request;
- 11 respondents requested that TransCanada's database for EPN be updated; and
- 2 respondents requested information on gas service.

TransCanada has not received any queries that objected to the proposed routing of the pipeline. However, TransCanada was apprised of a number of concerns regarding the proposed application.

During the GH-3-95 information request process, the Ontario Pipeline Coordinating Committee ("OPCC") requested TransCanada agree to certain undertakings respecting environmental aspects of the construction and operation of the proposed facilities. TransCanada's response was that it had difficulty agreeing to the undertakings as specified and that it preferred those which it had given to OPCC in last year's GH-2-94 proceeding. It was clear that TransCanada's position had not changed when the hearing took place, given certain answers TransCanada's witness provided to OPCC in cross-examination. In argument, TransCanada stated that the undertakings remained unacceptable but that negotiations with OPCC would continue and hopefully resolve the matter. TransCanada felt that it would be inappropriate for the Board to impose undertakings in a format unilaterally suggested by Ontario Ministry of Natural Resources ("OMNR"). TransCanada argued that the undertakings it had given to OPCC in GH-2-94 could be included as conditions to any certificate issued in respect of the GH-3-95 proceeding.

By a letter dated 17 August 1995, Environment Canada (Saskatchewan Region), a letter dated 21 September 1995, Environment Canada (Manitoba Region), and letters dated 1 September and 26 September 1995, Environment Canada (Northern Ontario Region), provided the Board with specialist advice on TransCanada's proposal. Environment Canada's recommendations and concerns are addressed in this review.

By a letter dated 17 August 1995, DFO (Saskatchewan and Manitoba Areas), and a letter dated 24 July 1995, DFO (Northern Ontario Region), provided the Board with specialist advice on TransCanada's proposal. DFO's recommendations and concerns are addressed in this review.

Views of the Board

The Board is satisfied that TransCanada has notified and discussed the proposed application in a timely and satisfactory fashion with government agencies, public interest groups and affected landowners.

5.2 Land Matters

5.2.1 Requirements of the Act in Respect of the Routing of New Pipeline Facilities

If the Board is satisfied with the proposed general route of a particular loop section of pipeline and issues a certificate in respect to it, the pipeline company must submit to the Board, prior to commencement of construction, plans, profiles and books of reference ("PPBR") which, among other things, lay out the detailed route of the pipeline segment.

In its application, TransCanada requested that the applied-for facilities be exempted, pursuant to section 58 of the Act, from the provisions of paragraphs 31(c) and 31(d) and section 33 thereof. Such exemptions would relieve TransCanada from the necessity of filing a PPBR for Board approval.

Views of the Board

In deciding whether or not to exempt TransCanada from the provisions of paragraphs 31(c) and 31(d) and section 33 of the Act, the Board is mindful of the rights of adjacent landowners who might be affected by the proposed construction. The Board is of the opinion that, due to the proposed location of the facilities (i.e. on existing easements or new easements adjacent thereto), it is unlikely that those landowners would be adversely affected in the long-term by the proposed construction.

The Board is mindful that landowners, whose property TransCanada proposes to acquire, have their rights under the Act protected. However, the Board is also aware of the potential problems for TransCanada if it is unable to obtain all the necessary land rights. Therefore, the Board is prepared to grant the requested exemptions subject to a condition which will permit construction to commence only if TransCanada has obtained all required land rights along any specific loop section or, if the land rights have not yet been obtained, has demonstrated that the landowner rights prescribed in the Act will not be prejudiced. The Board is of the opinion that the wording of the condition proposed by TransCanada, and included in Appendix II of these Reasons, protects the rights of landowners while allowing TransCanada flexibility in instituting the right of entry process.

Decision

The Board will grant TransCanada an exemption from the provisions of paragraphs 31(c) and 31(d) and section 33 of the Act subject to the Exemption Order Condition listed in Appendix II of these Reasons.

5.2.2 Route Selection

Apart from the loop previously authorized by the Board by Order XG-T1-37-95, TransCanada has applied for a total of 289.6 km of line pipe, consisting of fifteen loop sections in the provinces of Saskatchewan, Manitoba and Ontario. The location, length and land requirements for each loop section are found in Table 5-1.

Where new facilities could not be located on existing easements due to easement width constraints, TransCanada proposed that they be located adjacent to the existing easements provided that environmental, engineering, construction and safety concerns were met. All proposed loop sections are adjacent to existing easements.

Views of the Board

The Board agrees with TransCanada's rationale for installing the proposed new looping facilities either within existing easements or adjacent to existing easements with associated temporary workspace. The general routes proposed by TransCanada for those loop sections are acceptable to the Board.

5.2.3 Land Requirements and Notifications

5.2.3.1 Land Requirements

TransCanada provided the rationale for its specific land requirements and for each loop location, including schematics of said requirements.

Station Facilities

TransCanada submitted that all of the compressor and meter station additions would be constructed on lands owned in fee simple by TransCanada and, therefore, no new or additional lands would be required.

Easements

TransCanada provided the Board with schematics of the land requirements for each loop location. TransCanada requires easements ranging in width from 10 to 56 m along the proposed loop sections.

Temporary Work Space

TransCanada requires from 10 to 40 m of temporary work space for machinery movement, the storage of topsoil and subsoil, and to ensure that no environmental or landowner interests are compromised during construction. This is in accordance with TransCanada's Pipeline Construction Specifications (1993). Temporary work space in excess of 20 m may be required in areas where adverse conditions exist. Such areas include wetlands, rolling terrain and major river crossings.

Table 5-1
TransCanada's Proposed 1996-97 Facilities
Land Requirements

Loop Description	Loop Section	Length (km)	Permanent Width (m)	Easement Length (km)	Temporary Width (m)	Work Space Length (km)
SASKATCHEWAN 6th Loop						
MLV 12 to MLV 13	Caron	26.4	20.0	26.4	20.0	26.4
MLV 23 to MLV 24	Wapella	24.8	20.0	24.8	20.0/35.0	24.8
MLV 24 to MLV 25	Moosomin	27.6	20.0	27.6	20.0/40.0	27.6
MANITOBA 6th Loop						
MLV 29 to MLV 30	Rapid City	25.2	20.0/56.0	25.2	20.0	25.2
MLV 32 to MLV 33	Firdale	27.1	20.0	27.1	20.0	27.1
MLV 33 to MLV 34	MacGregor	27.0	20.0	27.0	20.0	27.0
MANITOBA 4th Loop						
MLV 41 + 12.0 km to MLV 42	Ste. Anne	18.3	10.0/30.0	18.3	10.0	15.9
MLV 43 to MLV 43 + 5.5 km	Spruce	5.5	10.0	5.5	10.0	5.5
MLV 45 to MLV 46	Camp Lake	19.1	10.0/15.0	18.1	10.0/15.0	19.1
ONTARIO 4th Loop						
MLV 46 to MLV 46 + 5.6	Clearwater Bay	5.6	15.0	5.6	10.0	5.6
MLV 59 to MLV 60	Gulliver River/Martin Loop	31.6	10.0	20.2	10.0/15.0	31.6
MLV 69 to MLV 71	Thunder Bay Shortcut/ Eaglehead Loop	25.7	10.0	25.7	15.0	25.7
MLV 71 to MLV 71 + 5.8 km	Seagull Lake	5.8	10.0	5.8	10.0	5.8
MLV 80 to MLV 80 + 13.8 km	Geraldton/Long Lac	13.8	10.0/15.0	2.6	10.0	13.8
MLV 102 to MLV 102 + 6.1 km	Cochrane	6.1	10.0	0.4	10.0/20.0	6.1
TOTAL		**289.6**		**260.3**		**289.6**

5.2.3.2 Notifications

For the looping program proposed by TransCanada, both landowners and individuals having interests in Crown lands are affected. TransCanada indicated that all owners and parties with an interest would be contacted, and it undertook to file a line list which would indicate the status of land acquisition. TransCanada further indicated that in compliance with section 87 of the Act, it would serve a notice of proposed acquisition on each party holding an interest in any of the lands that it proposed to acquire.

Section 112 of the Act - Controlled Areas

The Board, in its ongoing concern for the safety of pipelines under its jurisdiction, developed the *National Energy Board Pipeline Crossing Regulations* ("the Regulations") pursuant to section 112 of the Act. The Regulations, which came into effect in October 1988, establish the conditions under which excavation and construction activities near pipelines can be safely conducted by third parties. Legislation introduced in June 1990 broadened the scope of section 112 of the Act by regulating excavation activity within 30 m of the pipeline right-of-way.

Part I of the Regulations applies to contractors, facility owners and individuals who will be excavating using power-operated equipment or explosives or who will be constructing a facility across, on, along or under a Board-regulated pipeline or right-of-way. Under the Regulations, permission from the pipeline company is required before any excavation or construction activity is carried out. Part II of the Regulations defines the responsibilities of the pipeline company in order to ensure that safe practices are followed. If a contractor, facility owner or individual cannot obtain the pipeline company's permission, or cannot meet all the requirements of the Regulations, then approval from the Board must be obtained before work on the right-of-way or within 30 m of the pipeline commences.

TransCanada acknowledged that the Regulations have the potential to affect all landowners within 30 m of a pipeline, whether or not they have, or will have, granted TransCanada an easement. As part of a Landowner Notification and Public Awareness Program, TransCanada did indicate that every three to five years, TransCanada has meetings with all landowners who have granted the company an easement. TransCanada further indicated, that as part of its Public Awareness Program, TransCanada serves upon landowners who have granted TransCanada an easement a copy of the *General Guide to TCPL Operations* identifying the requirements of the Regulations. TransCanada noted, however, that other landowners affected by the 30 m zone would be served with the aforementioned document only if they were to attend a community open house.

TransCanada submitted that no reference to the Board's requirements under section 112 is made within any of TransCanada's land acquisition documentation. TransCanada was of the view that inclusion of the requirements therein may mislead a landowner into thinking that TransCanada may be seeking some interest in the adjacent 30 m strip of land.

Views of the Board

Because of the potential effects on affected landowners, the amount of land (whether acquired as fee simple lands, easements, or temporary work space) required for pipeline construction is of concern to the Board. The Board finds that TransCanada's anticipated requirements for fee simple lands, easements and temporary work space are reasonable and justified.

The Board is of the view that section 112 of the Act, and the Regulations made thereunder, do not create an interest in land, and have been provided for the safety of the public and for the safe operation of pipelines under its jurisdiction. The Board acknowledges TransCanada's undertaking, as part of its Public Awareness Program, to notify all landowners potentially affected by the 30 m zone.

The Board is concerned that all landowners have their rights under the Act protected. To ensure the timely and systematic notification of all potentially affected landowners, the Board expects TransCanada to serve written notification identifying the requirements of section 112 and of the Regulations during the service of land acquisition documentation.

5.3 Environmental Matters

5.3.1 Loop Facilities

In its application, TransCanada identified a number of environmental issues which could result from the pipeline construction. Those effects, and mitigative measures proposed by TransCanada, were presented in the assessments. During the GH-3-95 proceedings, additional information was requested and obtained by the Board regarding certain site-specific environmental effects and the mitigative measures proposed.

Winter Construction

TransCanada submitted that the following locations in its Central Section cannot be practicably constructed in summer and will therefore need to be constructed during the winter of 1995-1996 to meet projected requirements:

MLV 43 to MLV 43 + 5.5 km
MLV 46 to MLV 46 + 5.6 km
MLV 71 to MLV 71 + 5.8 km
MLV 102 to MLV 102 + 6.1 km
MLV 45 to MLV 46
MLV 69 to MLV 71
MLV 80 to MLV 80 + 13.8 km

TransCanada indicated that these areas are characterized by muskeg, swampy terrain or otherwise high water tables that can make access and construction in summer extremely difficult and costly. During the winter, water levels are usually lower and the terrain is frozen enough to permit construction activities at a considerable cost savings over summer methods. Frozen terrain eliminates the need for much of the extensive rip-rap or other earth stabilizing works that would otherwise be necessary for heavy equipment operation. Further, TransCanada indicated that the duration of construction and local disruption will also be significantly shorter if winter construction is used in these areas. TransCanada stated that it has developed and practiced "state-of-the-art" cold weather construction techniques for over 20 years and is convinced that these methods will provide the most sensible solution to the construction problems faced in these areas.

Soils and Agricultural Land

The proposed facilities cross agricultural lands in a number of areas. The primary concerns for pipeline construction through agricultural lands include potential conflicts with land use practices, loss of soil capability from soil mixing, soil loss through erosion, loss of soil structure through compaction or rutting, disruption of surface drainage, weed contamination of topsoil, and increased surface stoniness.

TransCanada submitted that the mixing of organic and nutrient-rich surface soil with mineral subsoil, which is generally less fertile and less suitable, physically and chemically, as root zone material can occur during construction. Further, the physical loss of surface soil will lower the capability of the land by decreasing the amount of available nutrients and organics in the root zone. The severity of the problem is directly related to the erodibility of the soil and the proportion of the surface soil lost. TransCanada further indicated that the capability of a soil to support plant growth can also be altered if the soil is compacted. Compaction affects capability by restricting root penetration, restricting water movement through the soil and making cultivation more difficult. Compaction also affects soil aeration by decreasing soil porosity. Finally, grading, topsoil stripping and trenching can bring rocks, in excess of natural conditions, to the soil surface. This, in turn, can result in damage to farm implements, reduced agricultural capability and increased operating expenses for farmers.

TransCanada's standard practices, as set out in its Pipeline Construction Specifications (1993) and its Environmental Management Handbook (1995), are designed to minimize conflicts with farming operations and to ensure soil conservation under normal pipeline construction. TransCanada indicated that the following mitigative/reclamation techniques will be employed:

- strip topsoil whenever grading is conducted;
- restrict construction activities if wet soil conditions exist and wait until soils dry;
- determine the presence and thickness of compacted soils and use a subsoiler to alleviate compaction in the subsoil to a maximum depth of 60 centimetres ("cm") and cultivate compacted topsoils to plough depth;
- minimize surface disturbances;
- apply appropriate fertilizer as determined in consultation with the landowner;
- water the right-of-way;
- shape storage piles so as to minimize wind erosion;
- use tackifier, mulch or other measures as required;
- limit the length of the time the trench will be left open;
- leave breaks in the trench crown to allow movement of water across the right-of-way and break at frequent intervals where sloping terrain is encountered;
- identify surface patterns during construction and integrate mitigation plans to ensure those patterns are restored during re-contouring;
- pick rocks greater than 0.1 m in any dimension to a depth of 0.3 m. This will require picking rocks from the top of the subsoil prior to the replacement of topsoil, and also picking rocks in the topsoil to the equivalent of or better than, the surrounding area;
- dispose of rocks at approved sites; and
- any areas of tile-drained land will be determined through discussions with landowners prior to construction. As necessary, a qualified local drainage specialist will be employed to determine the location of tile systems and to develop drainage restoration plans.

TransCanada indicated that introduction of weed species should be avoided as weeds compete with re-vegetated native species, lower the agricultural capability of an area and invade adjacent fields. In areas where the soil has been disturbed and lacks vegetative cover, local weed species may become established. TransCanada submitted that controlling the spread of weed species from one area to another along the expansion line can be accomplished by:

- washing all vehicles and equipment prior to entry and following the completion of each loop;
- seeding and fertilizing non-cultivated portions of right-of-way and roadside ditches with an appropriate seed mix; and
- monitoring the loop for weed species and treat with appropriate weed control treatment.

TransCanada stated that the regional Extension Agrologist from Saskatchewan Agriculture and Food would be notified regarding any concerns with respect to the spread of noxious weeds. TransCanada also indicated that noxious weeds do occur in the Wapella area, with scentless chamomile becoming an increasing problem in this part of Saskatchewan. TransCanada indicated that a committee of representatives from surrounding Rural Municipalities ("R.M.s") has been set-up to identify any concerns regarding noxious weeds (Agricultural Development and Diversification Board).

TransCanada proposed that during the rare plant survey of the MacGregor Loop (Manitoba) and the Carberry Sand Hills portion of the Firdale Loop (Manitoba), the presence and location of leafy spurge infestations will be ascertained. Where found, populations or individuals will be sprayed directly with an application of 2,4-D ester before construction. This herbicide is preferable to Round-Up as it delays or eliminates seed production of leafy spurge yet allows for the growth and development of native grass species.

The potential impacts on forest soils are related to soil erosion and surface stability. TransCanada indicated that the following mitigative/reclamation techniques will be employed in forested areas:

- as required, generic and site specific sediment control plans will be developed to provide overwinter erosion control along the cleared right-of-way. Site specific erosion control measures include the use of cross or terrace berms, silt fences, check dams and erosion control matting;
- topsoil will not be stripped which, in most situations, minimizes clearing requirements since less temporary work space will be required for soil storage;
- stumps will be removed only directly over the trench line and travel area, which conserves the remaining topsoil and ensures minimal compaction and erosion; and
- as required, organic matter debris and slash material will be stored along the edge of the right-of-way and respread on erosion-prone areas.

Vegetation

The construction of the proposed loops could lead to the loss of significant vegetation such as native prairie vegetation, rare or endangered vascular plants, wetland vegetation, and/or merchantable timber.

Where appropriate, TransCanada indicated that re-seeding will be undertaken following construction. TransCanada stated that the objectives employed in seed mix recommendations are to provide a seed mix which will quickly stabilize the soil, thus minimizing soil loss and water quality degradation

problems. TransCanada indicated that the species in the seed mix should not be so aggressive as to encroach into native vegetation types and compete with native species. TransCanada proposed several seed mixes, depending on the soil conditions (wet or dry) and on the nature of the surrounding vegetation (improved pasture, alkaline soils, wetlands, native prairie, or cultivated). Further, the use of a particular seed mixture is also dependent on its availability at the time of construction, the timing of re-seeding and the preferences of landowners.

TransCanada indicated that new seed species were incorporated into recommended mixtures for the Saskatchewan and Manitoba facilities as result of discussions with John Morgan of Prairie Habitats, Kirk Lowen of Prairie Seeds and Manitoba representatives of Ducks Unlimited. These individuals provided suggestions for native seed mixtures and wetland seed mixtures during the preparation of the assessments.

Environment Canada (Saskatchewan Region) provided specialist advice which supported TransCanada's re-vegetation plans, with some exceptions relating to the use of Brome Grass and Downy Brome. TransCanada has undertaken, during the oral portion of the Hearing, to confirm that the seed mixtures used in Saskatchewan are free from Downy Brome. Further, in its response to Board IRs 3.9 and 3.10, TransCanada indicated that the Improved Pasture Seedmix originally proposed for the Moosomin Loop has been replaced with the same mix proposed for the Wapella Loop, thus deleting both Kirk Crested Wheatgrass and Brome Grass which are aggressive species.

TransCanada stated that protection of rare plants and their associated habitats are a corporate, provincial and national concern. For the Saskatchewan and the Manitoba facilities, rare plants may be encountered in areas where proposed pipeline looping projects traverse uncultivated areas of native vegetation. Uncultivated areas of native vegetation occur in native prairie, ungrazed aspen stands, wetlands, wooded areas and slough margins. TransCanada submitted that where the pipeline passes through a significant portion of native prairie, woodlands and/or depressional wetland areas such as ephemeral and permanent pothole sloughs, permanent and ephemeral drainages, native grassland and native forest, the following mitigative/reclamation techniques will be employed:

- minimize clearing along the right-of-way to the extent feasible, including a reduction in the width of the temporary work space;
- where clearing of woody vegetation is required, windrow all slash along the right-of-way and salvage for rollback during the reclamation phase;
- employ a standard topsoil lifting system for soil stripping and reclamation, in order to conserve and maintain the integrity of the topsoil, and to maintain the natural seed and root mix within the topsoil layer;
- where possible, attempt to preserve the organic marsh soils and vegetation at all wetland sites and replace following construction to promote marsh vegetation recovery;
- re-contour to the original topography to allow for the natural drainage conditions to be re-established;
- re-seed margins of wetlands and sloughs, including those at water crossings with a wetland mix of native grass and herb species; and
- re-seed specified areas of native vegetation with a native upland seed mix as specified in its application or suitable alternate.

TransCanada conducted field surveys in areas with the greatest potential to support rare plants (areas which have not been altered by cultivation or highly utilized by cattle). A total of six rare plant

species were identified at 29 locations along the native vegetation areas surveyed. TransCanada indicated that at ten locations, no mitigation is warranted unless required by the Regional Biologist. Mitigative measures such as narrowing down or transplanting have been recommended for the remainder of the locations where rare plants were observed. TransCanada stated that impacts to rare plant species will be minimized through the implementation of these mitigative measures. TransCanada submitted a table summarizing observations of greater significance and recommended mitigative measures (Appendix III, Table 1).

TransCanada stated that, based on consultations with the local OMNR staff during the preparation of its assessments for the Northern Ontario facilities, no rare or endangered plant species or species assemblages are known to occur in the vicinity of the proposed loops.

The Camp Lake Loop (Manitoba) is situated within the boundaries of the Whiteshell Provincial Park and is covered by native vegetation. TransCanada proposed that the potential for rare plants along this loop is greater than along the other loops considered in the proposed Manitoba facilities. In response to the pristine state of the vegetation and the protected status of the Provincial Park, TransCanada proposed that throughout the Camp Lake Loop the following mitigative efforts be employed:

- minimize clearing along the right-of-way to a maximum width of 10 m;
- minimize the temporary work space to a maximum width of 15 m;
- avoid locating push-outs in areas with undisturbed native vegetation and/or mature trees;
- re-contour to the original topography to allow for the natural drainage conditions to be re-established;
- employ a two-lift system for soil stripping and reclamation, in order to conserve and maintain the integrity of the topsoil, and to maintain the natural seed and root mix within the topsoil layer;
- to promote marsh vegetation recovery, topsoils will be removed immediately before excavation;
- replace organic marsh soils and vegetation following pipeline installation;
- re-seed margins of wetlands and sloughs, including those at water crossings with a wetland mix of native grass and herb species; and
- re-seed areas on till and bedrock with native seed - woodland seed mix.

Resulting from its review of the Environmental and Socio-Economic Assessment for the Manitoba facilities, Manitoba Natural Resources, Policy Coordination Branch, provided comments and recommendations in a letter dated 29 June 1995. In a letter dated 27 July 1995, TransCanada agreed to:

- contact the Director of Parks and Natural Areas and the Director of the Eastern Region, prior to construction to discuss timing and the site-specific issues that need to be addressed; and
- send, prior to construction, a detailed map of the pipeline corridor for the Camp Lake Loop to the Manitoba Natural Resources office for the purpose of appraising the forestry resources.

The Firdale Loop traverses the Carberry Sand Hills, located between MLV 32 + 2.2 km and MLV 32 + 8.8 km, which is a large parcel of native vegetation. This is an area of steeply sloping sandhills, interspersed with drainages and wetlands. According to TransCanada, the Carberry Sand Hills section

has the greatest potential to support rare plant species. Due to the size of the area of native vegetation associated with the Carberry Sand Hills, it is recommended that special mitigative efforts be employed. TransCanada proposed that the right-of-way width and temporary work space width will be reduced. This can be accomplished by not allowing land clearing for a passing lane throughout this area. TransCanada indicated that while this may necessitate a slower work pace during construction, the results will greatly minimize overall impact to the native vegetation within this portion of the loop. In addition, this will effectively reduce the reclamation efforts required, such as seeding with native grasses, and the soil stabilization techniques necessary due to the highly erodible nature of the sandy soils.

Wetlands in Northern Ontario have not yet been classified, but have generally been identified by the OMNR as sensitive environments if they provide significant waterfowl habitat. The Ontario Government (1992) issued a Wetlands Policy Statement intended to ensure that there will be no loss of wetland functions of Provincially Significant Wetlands. In the Boreal Region, development may be permitted within Provincially Significant Wetlands and on adjacent lands subject to an Environmental Impact Study. TransCanada stated that none of the wetlands to be traversed by proposed loops in Northern Ontario has been designated as Provincially Significant Wetlands or as being environmentally sensitive. TransCanada submitted that where the pipeline passes through wetland areas in Northern Ontario, the following mitigative/reclamation techniques will be employed:

- topsoil stripping within the wetland area is not recommended;
- the number of trees removed will be kept to the minimum necessary for construction operations;
- any trees removed in the wetland will be cut flush with the terrain surface and, where practicable, the stumps left in place, except along the ditch line;
- after construction, wetland will become re-established naturally and/or by handplanting contiguous stock, where appropriate; and
- where an organic mat overlies the subsoil, consideration will be made to strip the layer over the trench and preserve it for re-use during restoration of the site.

The removal of vegetation has both environmental and economic impacts. TransCanada submitted that the major forest resource issues include: loss of merchantable timber; damage to trees along the temporary work space during initial clearing; loss of or damage to specimen trees; the handling of slash and potential for fire; and the creation of push-outs. In order to mitigate the potential environmental effects of pipeline construction on vegetation, TransCanada proposed that, where the pipeline passes through forest lands, the following mitigative/reclamation techniques be employed:

- damaged branches will be pruned properly and the stubs will not be dressed, i.e. no treatment with tree painting emulsions;
- any heavily damaged trees will be cut and stacked along the temporary work space or right-of-way;
- brush and trees will be felled parallel to or into the right-of-way;
- all brush, tree tops, stumps and other debris cleared from the right-of-way should be burned, chipped or otherwise disposed of according to the OMNR work permit. If deemed appropriate by the Environmental Inspector, this material may be stored and respread after construction has been completed on steeper slopes;

- where corduroy or rip-rap is required for access along the right-of-way in wet areas, non-merchantable and poorest quality merchantable timber will be used before higher quality merchantable timber;
- the remaining merchantable timber will be cut and neatly stacked along the right-of-way or as requested by the licensee or the OMNR;
- clearing along the edge of forested areas will be restricted to the minimum necessary for construction operations;
- specimen trees marginal to the work space will be identified prior to construction, flagged and protected from damage;
- the size and location of fire piles will be controlled in a manner to prevent fire damage to adjacent standing trees;
- all necessary permits for burning will be obtained from the OMNR, and all conditions of these will be observed;
- minimize number of push-outs;
- any push-outs will be located so as to minimize visual impact; and
- the push-out site will be cleared of woody vegetation prior to use. The size and location of all push-outs must be acceptable to the OMNR.

Forest Management Agreements ("FMAs") between forest companies and the OMNR are tailored to meet specific forest management needs. Timber cutting in the FMA areas will be discussed with the licensee and the OMNR to delineate any conflicts between proposed cutting operations and pipeline construction activities. Any cutting of merchantable timber will require prior approval of the OMNR under a District Cutting Licence. TransCanada indicated that proposed harvest block boundaries were delineated and provided to TransCanada by OMNR offices responsible for the areas traversed by the Clearwater Bay, Gulliver River, Eaglehead, Seagull Lake, Geraldton and Longlac Loops. No OMNR representative indicated a concern related to the potential adverse environmental effects of the proposed pipeline construction on existing or future Timber or Forest Management Plans during the data collection stage.

The Spruce Loop (Manitoba) traverses between MLV 43 km to MLV 43 + 5.5 km a contiguous stand of mixed wood forest and wetland vegetation which is part of the Sandilands Provincial Forest. TransCanada indicated that potential adverse environmental impacts to the Sandilands Provincial Forest Reserve are related to the removal of native vegetation. TransCanada indicated that the land requirements for the proposed Line 100-4 pipeline construction have been reduced to a 10 m permanent easement and 10 m temporary work space. TransCanada also submitted that impacts to wildlife resulting from the removal of this vegetation are likely to be minimal as the majority of the clearing will occur between the east and west bound lanes of the TransCanada Highway and therefore this section of the forest reserve is not prime habitat for wildlife. Further, TransCanada submitted that construction of the Spruce Loop (Manitoba) is scheduled for December 1995 through March 1996 and therefore the nesting and breeding periods of the species of concern in the vicinity of the Spruce Loop will be avoided.

In a letter dated 28 August 1995, Manitoba Natural Resources did not indicate any concerns with respect to the Sandilands Provincial Forest. TransCanada indicated that it will continue to discuss the proposed construction with this agency and will consult with the Regional Biologist prior to construction.

Wildlife

TransCanada submitted that the primary potential impact on wildlife associated with pipeline construction is the reduction or modification of habitat and interference in nesting, breeding or migrating activities. TransCanada indicated that its construction schedules for the applied-for facilities will avoid highly sensitive periods for wildlife use. Further, TransCanada proposed that the following mitigative/reclamation techniques be employed to avoid or restore significant habitat areas:

- in the area of native vegetation, clearing and ground disturbance should be limited to that necessary for safe construction of the pipeline;
- the temporary workspace, and clearing of vegetation, will be kept to a minimum in these areas, and revegetation should be promoted in those areas disturbed; and
- any materials which may be harmful to wildlife, such as welding stubs, plastic wrapping, oil and grease, will not be deposited upon the right-of-way or work space areas. Regular (daily) garbage patrols will be undertaken during construction.

The Wapella Loop (Saskatchewan) crosses land that has been classified as Critical Wildlife Habitat ("CWH") for white-tailed deer and sharp-tailed grouse. In addition, approximately 1.65 km of the pipeline will cross Legislated CWH, N1/2 Sec 11-15-2 W2M and 1.6 km of the pipeline will cross Legislated CWH, Sec 11-15-1 W2M. TransCanada indicated that the construction of the Wapella Loop will require clearing of grass, shrub and tree cover which is habitat to white-tailed deer and sharp-tailed grouse. The loss of vegetative cover may have some adverse effects on these species as this habitat is used for winter cover. However, TransCanada submitted that the construction will avoid the sensitive winter period for these species (December to April). As well, the area to be cleared will be limited to an existing corridor and will be minor relative to the habitat available. As such, TransCanada stated that impacts to white-tailed deer and sharp-tailed grouse will not be significant.

In a letter dated 20 April 1995, Saskatchewan Environment and Resource Management ("SERM") indicated that although the loss of habitat in these areas during previous construction projects has been minor, the cumulative impact is becoming significant. SERM further indicated that its recommendation for any additional easement through this area will be granted for the north side of the existing easement only, claiming that the impact on wildlife habitat will be much less than if construction activities were carried out on the south side. As a response to this concern, TransCanada indicated that it has proven in the past, over a number of construction programs, to have a very effective restoration program. TransCanada stated that this loop could be constructed with a minimal and insignificant effect, resulting in minimal cumulative effect on the habitat. TransCanada has undertaken to provide the Board with updated information regarding the carrying-out of construction activities on the south side of the habitats identified by SERM as opposed to the north side of these habitats.

TransCanada stated that local OMNR staff were consulted on the location and extent of moose concentration areas and areas of moose aquatic feeding habitat for Northern Ontario facilities. None of the OMNR representatives expressed specific concerns related to the construction of the proposed loops through or adjacent to these areas. Based on these discussions and given the proximity of the proposed looping facilities to Highway 17, which has conditioned the moose in the area to noise, TransCanada submitted that no adverse impacts to moose are expected.

Species of wildlife considered rare or endangered by the Committee on the Status of Rare and Endangered Wildlife in Canada ("COSEWIC") have breeding ranges overlapping some of the proposed pipeline corridors. TransCanada indicated that clearing of willows or clumps of shrubs along the right-of-way will be kept to a minimum where possible. If construction is unavoidable during the breeding season, a pre-construction survey will be conducted to ascertain the presence or absence of breeding of any of the species of concern on or near the proposed pipeline right-of-way. TransCanada proposed that the following procedures be carried out where evidence of breeding is found:

- no-construction buffer zones around each breeding site will be established until the young have left the nest or breeding area. Currently, there are no specific guidelines in Manitoba that dictate the minimum buffer widths that should be established for each species. Clearly, the buffer zone width will depend a great deal on the density of vegetation and the nature of the terrain at each site, as both vegetation and terrain can dissipate the effects of visual and auditory stimuli. In addition, the local abundance of the species and the location of the study area relative to the distributional range of the species are factors to take into account. For the Saskatchewan facilities, TransCanada received guidelines from SERM. These guidelines, entitled "Guidelines for Activity Restriction for Sensitive Species in Saskatchewan", were filed with the Board. TransCanada indicated that it will, to the extent possible, adhere to these timing restrictions in areas where habitat for species with special status exists. TransCanada also indicated that where timing restrictions cannot be adhered to, a field survey will be undertaken prior to construction. Mitigative measures for nesting birds located during this survey will be developed in consultation with the Regional Biologists;
- the site and its surrounding buffer should be clearly marked and the construction crews notified as to its location and the dates during which construction can proceed; and
- the provincial Rare and Endangered Species Biologist will be provided with a map of all observations of endangered species at the end of the project.

TransCanada conducted field surveys in the area of greatest potential to support rare wildlife species for the Saskatchewan and the Manitoba facilities. The faunal survey confirmed the presence of the following species with specified conservation status: great gray owl; eastern bluebird; Baird's sparrow; and plains spadefoot toad. TransCanada submitted a table summarizing observations of greater significance and recommended mitigative measures (Appendix III, Table 2). TransCanada also indicated that small mammals, such as the Wyoming pocket mouse and plains pocket gopher fall into a category of species with special conservation status as do all of the reptiles and amphibians under consideration. TransCanada proposed that the primary mitigative measures for these species in the context of the proposed project are:

- habitat protection by limiting all disturbance to the right-of-way and previously established access roads, when traversing areas with native vegetation suitable for these species; and
- close monitoring of the right-of-way prior to and during construction to relocate any individuals which may be at risk in active work areas.

TransCanada stated that in Northern Ontario there are no nests of rare, threatened or endangered bird species proximate to the proposed loops.

Environment Canada provided specialist advice which recommended that the proposed mitigative measures be carried out so as to minimize construction impacts on not only COSEWIC listed birds,

but all migratory bird species. TransCanada indicated that the extension of the commitment to avoid rare and endangered species during the breeding season to all migratory birds would be onerous and likely preclude the construction of pipeline facilities during the summer period. As indicated in the 21 September 1995 letter from Environment Canada, the critical nesting to fledging period for migratory birds is generally from mid-May to the latter part of July. TransCanada submitted that if construction is initiated in May or early June during the nest building period, the associated noise and visual disturbances will cause any birds that have initiated nesting to leave the area and relocate elsewhere within their nesting territory. TransCanada stated that this is particularly likely for those birds that do not have young in the nest. TransCanada also stated that it is a well-established fact that having lost their nest and or first clutch (eggs) early in the nesting period most birds will build another nest and/or lay a second clutch. Moreover, some bird species may successfully rear more than one clutch during the summer reproductive period. Because of these reproductive versatilities, TransCanada submitted that there would be no measurable effect on migratory bird populations.

TransCanada indicated that the numerous pothole sloughs in some regions of Manitoba provide some of the most productive waterfowl breeding habitat in North America. Approximately 20% of the ducks found on the prairies breed in the aspen parkland of southwestern Manitoba, and therefore, this region is considered priority duck habitat by the Canadian Wildlife Service due to the numerous pothole sloughs and marshes. Unless adequate reclamation is undertaken, disturbance to wetlands and sloughs may lead to a loss in waterfowl and wildlife habitats. TransCanada proposed that the following procedures be carried out to avoid any environmental effects on waterfowl:

- where it is possible, clearing will be kept to a minimum along the portion of the right-of-way which is considered to provide waterfowl nesting and brood rearing habitat;
- where possible, attempts will be made to preserve the organic marsh soils and vegetation at wetland sites and replace following construction;
- avoid the critical breeding, brooding and rearing period for waterfowl (1 May to 15 June); and
- re-contour wetland areas as soon as possible following construction and re-vegetate wetland fringes with suitable native grass species.

The entire Moosomin Loop (Saskatchewan) occurs within North American Waterfowl Management Plan Key Program Areas. The route also occurs within the Wildlife Development Fund Priority Area, an area targeted for the acquisition of native uplands to be set aside as waterfowl nesting habitat. TransCanada indicated that the North American Waterfowl Management Plan and the Wildlife Development Plan are administered by Ducks Unlimited. Discussions with Ducks Unlimited identified that there are no current or future projects by the North American Waterfowl Management Plan or the Wildlife Development Fund adjacent to TransCanada's right-of-way. TransCanada submitted that the proposed pipeline construction will not, therefore, impact any waterfowl habitat development projects.

The Pettapiece Ponds Ducks Unlimited project is located approximately 200 m north of the Rapid City Loop (Manitoba). TransCanada submitted that the distance between the proposed loop and the Pettapiece Ponds Ducks Unlimited project will serve as a sufficient buffer zone. This view is based on TransCanada consultants' recommendations and discussions with Mr. Rob Kirkness of Ducks Unlimited. Therefore, TransCanada stated that adverse environmental effects to Pettapiece Pond from the pipeline construction are not anticipated. Further, TransCanada indicated that it will consult with the local biologist prior to the construction of this loop to discern if there are any site-specific concerns with the construction of the Rapid City Loop.

Stream Crossings and Fisheries Resources

The proposed pipeline looping projects cross a number of watercourses which could be adversely affected by construction-related activities. These activities include clearing and grading, trenching, installation of flow diversions, streamflow interruption, back-filling, hydrostatic testing and related activities such as equipment maintenance and waste disposal. One of the most serious adverse environmental effects on fisheries and downstream water users could result from increased concentrations of sedimentation downstream of the crossing. With respect to fisheries, pipeline construction could result in the disturbance and loss of existing and potential fish habitat at the stream crossing points, as well as downstream. Streambank erosion, sedimentation and toxic spills could decrease water quality and further reduce fish populations.

TransCanada indicated that its objectives for watercourse crossing procedures are to install the pipe while maintaining the downstream populations of aquatic life, minimizing the extent and duration of siltation from construction activities, maintaining an unimpeded flow of water and preserving the aesthetics of the area. TransCanada outlined in the TransCanada Environmental Management Handbook (1995) and TransCanada's Pipeline Construction Specifications (1993) a number of standard mitigative measures to be followed for all watercourse crossings, in an effort to limit potential environmental effects associated with wet and dry crossing techniques. TransCanada further indicated that it may recommend additional specific actions to be taken at the watercourse crossings based on actual field conditions and characteristics of the water crossings at the time of construction.

A procedure for screening proposed watercourse crossings was recently developed by BEAK Consultants Limited for TransCanada, and has been incorporated into the Environmental Management Handbook (1995). TransCanada explained that the purpose of this generic screening procedure is to assist in the identification of sensitive and less sensitive watercourse crossings, and those with no fish habitat, early in the environmental assessment process, for concurrence by government agencies. According to TransCanada, early identification of sensitive water crossings would help to facilitate a more efficient environmental assessment process, allowing assessment and engineering effort to be concentrated on specific watercourse crossings designated as sensitive and in need of detailed designs. For less sensitive crossings, standard construction procedures and designs will be used.

The proposed facilities traverse a number of watercourses, some of which are considered as sensitive stream crossings requiring specific crossing designs because of particular environmental, construction and/or engineering concerns. TransCanada indicated that it will comprehensively evaluate the effect of construction on fisheries habitat in sensitive watercourses to be traversed by the proposed loops before pipeline construction is initiated. Further, TransCanada indicated that it will consult with agencies such as the DFO, local SERM, Manitoba Department of Natural Resources and OMNR representatives to finalize detailed information regarding stream crossings. Some of the issues to be discussed on a site-specific basis include:

- finalization of timing restrictions;
- dry versus wet crossing procedures to be used;
- erosion and sediment control plans;
- stream bottom habitat restoration techniques to be used, such as rock placement; and
- the nature of sensitive stream banks/bottoms.

Prior to the commencement of construction, TransCanada will submit, for Board approval, additional information regarding stream crossings such as in-stream timing restrictions, site-specific mitigative and restorative measures to be employed as a result of undertakings to regulatory agencies, and status of approvals including environmental conditions.

TransCanada filed with the Board tables entitled "Watercourse Crossing Information" for all loops and watercourse crossings. These tables provide information on the location of the watercourse, the channel type, width and depth, the estimated flow, fisheries values, proposed crossing method[2] and timing restrictions. The Board has updated these tables based on information filed by TransCanada during the proceedings (Appendix III, Table 3). This information is in the form of Fisheries Resource Assessment reports, detailing watercourse sensitivity and fisheries values for the all permanent watercourses to be traversed by the proposed loops.

DFO (Manitoba and Saskatchewan Areas) provided specialist advice which considered the potential impacts to fish and fish habitat. TransCanada indicated that the Fisheries Resource Assessments for proposed looping facilities in Saskatchewan and Manitoba will be forwarded to DFO as part of TransCanada's request for Water Crossing Approvals from the DFO in Manitoba. TransCanada also indicated that Shoreline Alteration Permits will be sought from SERM in Saskatchewan and that DFO will be copied on the information sent to SERM.

The Rapid City Loop (Manitoba) crosses Lake Wahtopanah. The lake is the head pond of a dam on the Little Saskatchewan River. The flooded portion of the reservoir is approximately 760 m in width, and there are presently five existing pipelines crossing this area. TransCanada indicated that the lake is considered a locally significant recreational fishing area by the Manitoba Department of Natural Resources. TransCanada submitted that the potential impacts of the Lake Wahtopanah crossing can be minimized by conducting the crossing during reservoir drawdown. This will allow the width of the crossing to be substantially reduced, and thereby, the duration of the in-stream construction and potential for adverse aquatic effects will be minimized. The construction of the Lake Wahtopanah crossing is scheduled for completion during the winter construction program from December 1995 to March 1996. TransCanada indicated that it will request a drawdown of the reservoir from the Manitoba Department of Natural Resources, Water Resources Branch. The drawdown will, according to TransCanada, confine the in-stream pipeline construction to the width of the original river channel. This level is approximately two metres below the level to which the reservoir is typically drawn down for the winter months. TransCanada discussed the proposed drawdown with Manitoba Natural Resources, Water Resources Branch and they have indicated that, from an operational stand point, lowering of the reservoir to this level will not be a problem.

In the "Assessment of Aquatic Resources and Sensitivities at Water Crossings along the proposed Rapid City Loop Expansion" report, September 1995, TransCanada indicated that the crossing of Lake Wahtopanah during drawdown conditions will allow much of the pipeline to be installed by dry crossing techniques. Wet crossing methods will be required for the original Little Saskatchewan River channel. Water quality monitoring during construction is recommended to ensure that oxygen depletion is not a problem in the reservoir. If required, TransCanada proposed measures to be initiated to ensure

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[2] TransCanada's criteria used in evaluating and selecting the preferred water crossing technique are: stream depth and width; anticipated flow rates during construction; substrate conditions; geotechnical; engineering; cost; land requirements; environmental sensitivity of the specific water course; and equipment limitations.

adequate oxygen in the reservoir (eg. removal of ice cover, water agitation and/or aeration). In addition, to re-establish the bank contours, TransCanada proposed to cap the pipeline trench at the original Little Saskatchewan River channel with clean cobble aggregate material. This material will aid in stabilizing the pipeline corridor and may provide spawning habitat for walleye.

Further, TransCanada indicated that since vegetation will need to be cleared to facilitate the proposed crossing of Lake Wahtopanah, there is a concern that bank cover may be reduced as a result of the construction operations. The vegetation which is present in the area of the proposed alignment is predominantly grasses which can normally be re-established quickly. In an effort to ensure re-vegetation of stream side areas, TransCanada indicated that clearing will be minimized to that required for safe and economically feasible construction. Approach slopes to the crossings will be re-vegetated with the riparian area seed mixes specified in TransCanada's assessments as soon as possible after the completion of the construction activities. Further, to protect the native grassland habitat along the western shore of Lake Wahtopanah, TransCanada indicated that it will, to the extent possible, preserve the native sod being stripped. This measure, in conjunction with re-seeding the area using only native grass species, should ensure that the area is restored.

In a letter dated 31 May 1995, Manitoba Natural Resources, Fisheries Branch, expressed concerns with respect to the potential impacts to fisheries resources, benthic invertebrates, anglers and cumulative effects of the crossing of Lake Wahtopanah. TransCanada addressed these concerns by conducting a more detailed assessment of Lake Wahtopanah. The results of this survey were included in a report entitled "Fisheries Related Concerns Associated with the Proposed Winter 1995-96 Crossing of Lake Wahtopanah" prepared by Golder Associates Ltd., August 1995. Copies of this report were forwarded to Manitoba Natural Resources and filed with the Board. In a letter dated 12 September 1995, Manitoba Natural Resources, Fisheries Branch indicated that it still has concerns about long-term cumulative effects. Fisheries Branch also proposed some changes and additions to the Golder Associates Ltd. report (August 1995). Fisheries Branch has indicated that it will not oppose the crossing provided:

- it is completed as described in the previous facilities application (crossing completed in 1991);
- TransCanada adheres to methods presented in its Environmental Management Handbook (1995);
- monitoring is carried out as outlined in the Golder Associates Ltd. report (August 1995) ;
- low oxygen contingency measures are used; and
- reservoir outlet screening, if practical, is provided.

In a letter dated 29 September 1995 to Manitoba Natural Resources, TransCanada indicated that it is presently revising the Golder Associates Ltd. report (August 1995) to include many of Manitoba Natural Resources, Fisheries Branch's suggestions and to address some of the additional points raised by Manitoba Natural Resources. The revised report on Lake Wahtopanah, including detailed site-specific sediment control plans, will be filed with the Board in late October 1995. Further, TransCanada agreed to accept the crossing conditions required by Manitoba Natural Resources and will continue to develop further contingency plans and mitigative measures in consultation with Manitoba Natural Resources' Fisheries Branch staff.

TransCanada indicated that physical constraints to the installation of a fourth line have been identified at the two watercourse crossings within the Geraldton Loop (Northern Ontario). At the Kenogamisis

River, the shoreline parallels the southern limit of the right-of-way along the upstream approach and river bank; only a narrow treed buffer exists between the right-of-way and the shoreline. At Crib Lake Tributary, a flooded wetland area containing Crib Lake Tributary occurs on and to the south of the existing right-of-way. TransCanada stated that these constraints will be taken into account in the construction design. Based on previous construction experience, TransCanada proposed that a wet crossing will be required for the Kenogamisis River and Crib Lake Tributary. Further, detailed site-specific sediment control plans will be developed in consultation with OMNR prior to in-stream construction.

A number of difficulties/variations from construction specifications were reported during the most recent crossing of the Little Seagull Creek (Northern Ontario). This stream flowed within the proposed new easement, but did not cross existing right-of-way or ditchline and, therefore, had not been identified during pre-construction surveys. As a result, a 40 m portion of this creek was inadvertently re-channelled during right-of-way preparation. Due to high snow levels during construction, the exact course of the creek was difficult to determine. After the snowpack melted, disturbed portions of the creek channel were re-established and rip-rapped. In addition, pea size spawning gravel was installed and boulders were placed on the streambed to enhance fish habitat. TransCanada submitted, in its response to the Board IR 3.51, that its standard sediment and erosion control procedures will be adequate to mitigate any potential adverse environmental effects on the watercourse. Further, TransCanada indicated that a survey drawing will be prepared to ensure that all construction procedures and conditions are identified prior to work at the watercourse.

TransCanada stated that winter construction would occur during the water crossing timing restriction for coldwater streams within Eaglehead Loop and Seagull Lake Loop. Therefore, TransCanada proposed that special mitigative/restorative measures will have to be developed, such as:

- for wet crossings, in-stream construction, if possible, would be undertaken after the critical spawning period, i.e. after 30 November, and/or egg incubation period, i.e. after 31 January;
- for dry crossings, access construction may occur prior to the sensitive spawning period; and
- prior to dry crossing flume installation, provision of cobble/stone base on the streambed and rip-rap armouring on the banks, as well as sandbag placement at the ends of the flume to ensure stream discharge through the flume.

TransCanada indicated that blasting will likely be required at the perennial watercourses to be traversed by the Thunder Bay Shortcut East, Seagull Lake and Eaglehead Loops. Based on prior pipeline loop construction experience along the Thunder Bay Shortcut, TransCanada stated that with the proper selection of explosives and minimization of the number of blasts, impacts on fish populations will be short-term and minor.

TransCanada submitted that vehicular access over watercourses can be afforded by a number of techniques including usage of travel pads, barges, bridges and culverts with rip-rap. Based on previous construction experience, TransCanada stated that removable bridges and culverts with rip-rap are generally the preferred access techniques. The use of bridges and culverts with rip-rap facilitates more frequent crossings by heavy machinery and makes the passage of rubber-tired vehicles environmentally acceptable. During previous winter construction, ice bridges were constructed to provide access across watercourses. TransCanada's generic sediment control plan for temporary

vehicle crossings will be followed in the construction of access structures over watercourses. TransCanada indicated that recommendations for access type at the watercourse crossings will be incorporated in the site-specific construction specifications.

Test Water Withdrawal and Discharge

TransCanada indicated that waterfowl habitat in small watercourses or ponds can be adversely affected by removal of excessive water volumes or withdrawal rates. Further, discharge of hydrostatic test water may result in short-term impact on water quality. Impacts may include elevated levels of turbidity, total solids, conductivity, iron and total organics. Erosion problems or flooding can also result from excessive water volumes or discharge rates.

To avoid impacts on natural waterbodies, TransCanada proposed that water withdrawal for hydrostatic testing will be limited to less than 10% of the watercourse discharge whenever possible. If >10% is required, TransCanada indicated that more detailed evaluation of the potential impacts to fish habitat will be undertaken. Further, where required, erosion control measures, such as dissipation of water energy and utilization of an energy diffuser, protection rip-rap, sheeting, tarpaulins or equivalent, will be undertaken to protect soils from severe erosion in the area of discharge during de-watering. TransCanada also indicated that permits to take water will be applied for and will make every reasonable effort to obtain permits from Saskatchewan Water Corporation, Manitoba Resources, Water Resources Branch and MOEE for the use and disposal of stream or lake water used for hydrostatic test purposes and any conditions identified on the permits will be adhered to.

Numerous studies undertaken for TransCanada have indicated that the discharge of hydrostatic test waters from new internally and externally coated pipe has negligible impact on receiving water quality due to mixing, dispersion and sedimentation processes. TransCanada submitted that hydrostatic testing of pipeline sections during winter conditions is usually carried out by heating the fill water and mixing this with source water at ambient temperatures in a process known as circulation. Circulation involves filling the pipeline segment initially with a hot water slug to warm the pipeline and surrounding soil. Water is then released at the opposite end, while injecting hot water with source water at the fill point until the water in the pipe reaches a temperature suitable (usually 1°C to 5°C) for hydrostatic testing. The only environmental consideration specific to winter testing is disposal of the water during circulation and after the completion of a test. The water is discharged at a site previously identified as acceptable to TransCanada, the landowner and regulatory authorities. TransCanada indicated that the surface of rivers or lakes, or low-lying vegetated depressions adjacent to the right-of-way but free of trees are suitable discharge locations.

Spills of Pollutants

TransCanada indicated that during construction activities spills of pollutants to soil or water bodies can be deleterious to vegetation and wildlife and may reduce soil capability. Any spills which occur during the course of pipeline construction will be handled as per TransCanada's standard spill response and contingency plans. TransCanada further indicated that containment berms for spoil can be constructed of an impervious material and/or saddle weights. Any spills of gas fuels or lubricants will be cleaned up immediately with suitable oil absorbent materials. TransCanada submitted that it will immediately repair any equipment leaking fuel, oil or hydraulic fluid and ensure service vehicles carry sufficient sorbant material. TransCanada stated that spills with the potential to create an impact to the

environment will be reported to Saskatchewan Spill Control and MOEE as required by provincial legislation. All waste and hazardous materials generated will be managed according to policies outlined in TransCanada's Environmental Management Handbook (1995).

Polyurethane foam is used for breakers during pipeline construction. The polyurethane foam drums contain isocyanate, a potentially hazardous material. The MOEE has determined that the empty isocyanate drums, once neutralized (with sodium bicarbonate), are non-hazardous waste. TransCanada proposed that the polyurethane foam drums will be crushed and landfilled at an appropriate location, or recycled as scrap metal. Any alternate use, such as municipal or private re-use as garbage cans, is not recommended by the MOEE.

Archaeological and Heritage Resources

TransCanada submitted a Heritage Resources Impact Assessment conducted by Fedirchuk McCullough & Associated Ltd. for the proposed facilities associated with the Caron, Wapella, and Moosomin Loops in Saskatchewan and the Rapid City, Firdale, MacGregor, Ste. Anne, Spruce, and Camp Lake Loops in Manitoba. FMA has recommended that no further study relative to the aforementioned loop sections is required. During the field study, 49 heritage sites were assessed relative to the proposed right-of-way. Seven of these sites are newly recorded. Of the total number of sites, two are isolated finds, 23 are artifact finds, 18 are artifact scatters, four are recurrent feature sites, and two are historic. The two historic sites consist of building foundations and a site containing mineral cairns. Of the sites assessed, nine locations are recommended for monitoring during topsoil removal and ditchline excavation. As outlined in TransCanada's Environmental Management Handbook (1995) if sites or artifacts are discovered during construction, all construction activities at that location will cease until the proper authorities are notified and approval to proceed is granted. As a result, TransCanada submitted that the proposed pipeline facilities are not anticipated to cause any detrimental impacts to heritage resources.

TransCanada identified the need for additional archaeological field investigation for the lands along the Martin, Geraldton, Gulliver River, and Longlac Loops. TransCanada submitted that the lands along the Thunder Bay East Shortcut, Cochrane, Clearwater Bay, Eaglehead and Seagull Lake Loops have been determined by Algonquin Associates to have low heritage resource potential. As outlined in TransCanada's Environmental Management Handbook (1995) if sites or artifacts are discovered during construction, all construction activities at that location will cease until the proper authorities are notified and approval to proceed is granted. As a result, TransCanada submitted that the implementation of these measures will ensure that heritage resources are adequately protected.

5.3.2 Station Facilities

Noise Levels

TransCanada submitted that each of the new compressor units would be designed such that its noise emissions, under normal operating conditions, would not exceed the higher of the existing station's property noise levels (without additional compression), or the applicable federal, provincial and/or municipal noise control by-laws/guidelines. TransCanada stated that no existing station property line noise levels would be exceeded with the addition of new compressor units at Stations 17, 92 and 110. TransCanada further stated that no noise complaints have been received as a result of normal operations at Stations 17, 92 and 110. In respect of conditions other than normal operations,

TransCanada submitted that the station emergency and unit blowdown piping are sized such that the duration of a blowdown is no more than two minutes. TransCanada further submitted that full station blowdowns occur once to twice a year, if at all, and unit blowdowns occur somewhat more frequently, but are typically of a shorter duration.

TransCanada, in response to Board IR 3.61, confirmed that it would notify the Board should sound surveys, undertaken after the installation of the compressor units at Stations 17, 92 and 110, indicate that noise levels, existing prior to the expansion at monitoring points and receptors, are being exceeded. TransCanada, in response to Board IR 3.61, also confirmed that it would notify the Board for a one year period after the unit additions, of any noise complaints received in association with operations and any measures that TransCanada has undertaken or would undertake to address the complaints.

Air Quality

The air contaminants of primary concern at each of the stations are the NO_x.

TransCanada indicated that the proposed 28 MW compressor to be installed at Station 17 will be an electric driven unit. The electric unit emits no gaseous emissions and there would be no incremental air quality impacts resulting from its installation.

The existing compressors at that station are gas-fired. TransCanada undertook an examination of air quality at Station 17, using the Industrial Source Complex Model, Version 2. The model was run using a five year (1987-1991) hourly meteorological data set for Regina Airport and upper air data from the Glasgow, Montana aerological site. Concentrations of NO_x at the plant boundary are projected to be below the 1 hour Federal Acceptable Objective concentration of 400 $\mu g/m^3$ and will be below the annual objective of 100 $\mu g/m^3$.

At Station 92, TransCanada indicated that the additional 28.3 MW compressor will originally be equipped with conventional burners and will be upgradable to dry, low NO_x ("DLN") burners when such equipment becomes available. TransCanada conducted an air quality modelling study for Station 92 using the Industrial Source Complex Model, Version 2. This study used five years of hourly meteorological data for the period 1987-1991 from the nearest meteorological observing station at Kapuskasing Airport, and mixing height data from Moosonee aerological station.

When the new compressor is installed, Station 92 is proposed to operate in such a way that the existing Plant A is in standby mode. In this scenario, the ground level NO_x concentrations are modelled not to exceed the maximum 1 hour Federal Acceptable Objective of 400 $\mu g/m^3$ at either of the nearby residences nor at any other point outside the TransCanada property line. Peak concentrations are projected to be 222 $\mu g/m^3$ with a conventional burner and 71 $\mu g/m^3$ with a DLN burner. Long-term NO_x concentrations with the proposed configuration are projected to be well below the Federal Acceptable Objective of 100 $\mu g/m^3$.

At Station 110, TransCanada indicated that the additional 28.3 MW compressor will originally be equipped with conventional burners and ultimately with DLN burners when such equipment becomes available. TransCanada outlined a number of potential configurations in which the new compressor will operate at the facility in conjunction with the existing compressors.

TransCanada conducted an air quality modelling study for Station 110 using the Industrial Source Complex Model, Version 2 and has simulated air quality conditions to be expected with several operating scenarios. This model uses five years of meteorological data for the period 1987-1991 from the nearest continuous unit observation site at North Bay Airport along with mixing height data from the Maniwaki meteorological station for the concurrent period.

TransCanada submitted that for all compressor configurations at the station, including the existing configuration, property NO_x concentrations are projected to be below the maximum 1 hour Federal Acceptable Objective (400 $\mu g/m^3$). At the two residences nearest the facility, maximum ground level NO_x concentrations were modelled to range between 5.7% and 26% of the 1 hour objective, and between 1% and 2% of the Maximum Annual Objective of 100 $\mu g/m^3$.

Environment Canada was requested to provide its specialist advice on the TransCanada application. Environment Canada has recommended that an air quality monitoring program for NO_x be established to validate the modelled NO_x estimates. Environment Canada has also commented, that based on emission rates of the DLN compressors, TransCanada was encouraged to present a DLN installation plan. TransCanada identified that DLN burner installation will occur at Station 110 in 1996 and the installation of DLN systems at Station 92 and seven other sites will occur shortly thereafter. TransCanada stated that it plans to install DLN technology at all other compressor stations when the compressors come due for replacement.

Environment Canada has also encouraged TransCanada to provide information on greenhouse gas emissions, in light of Canada's commitment to stabilize greenhouse gas emissions at 1990 levels by the year 2000. TransCanada provided estimates of CO_2 and CH_4 emissions for Stations 92 and 110. TransCanada also stated that it supports Canada's Voluntary Climate Change Challenge program and provided a copy of its "Preliminary Action Plan for the Voluntary Climate Change Challenge".

Socio-Economic Matters

TransCanada submitted that while the greatest potential for negative socio-economic effects from pipeline looping takes place during the construction phase, these impacts are generally short-term in nature. The magnitude and significance of these potential impacts will depend on the number of residents affected by the construction activities, the number and type of community facilities and essential services affected by construction activities, the ability of a community and its region to supply the project with required goods and services, the size of the construction workforce requiring local supplies and services, the length of time project workers will reside in the community and the region, and the time of year the construction activities will take place.

TransCanada submitted that the construction-related impacts on landowners include the generation of noise and dust, temporary loss of pasture or crop during construction and damage to hedgerows or shelter belts. TransCanada further submitted that its mitigative and compensatory measures such as dust control of roads, reseeding of pasture land, fertilizing of crop lands and replacement of fences and hedgerows have proven to have been very effective in minimizing any construction-related impacts in the past.

With respect to hospital, ambulance, local commercial, and municipal services, TransCanada submitted that while a slight increase in demand is likely, no major impacts on these services are expected. TransCanada also noted that no major impacts are expected on fire protection services.

TransCanada stated that interviews conducted with government officials and service providers have indicated that no major socio-economic impacts are foreseen from this project that would require specific mitigative measures. TransCanada further submitted that government officials and service providers consider its current compensation policies and practices to be adequate and fair.

Tourism and Recreation

TransCanada identified that tourism and recreation in Manitoba's Whiteshell Provincial Park and northwestern Ontario is an important component of the regional economy. Facilities have been developed for outdoor leisure-time activities such as camping, angling, hunting, canoeing, picnicing, and swimming. This component of the local economy is particularly sensitive to seasonal variation. Throughout this area, the tourist season is at its peak during the summer months. Communities and tourist operators with facilities and services occupied by construction workers may be unable to accommodate tourists and vacationers in their usual manner. This can potentially lead to market loss in the construction year and possibly over a longer term if tourists do not return to the area.

To minimize impacts on the local economy, TransCanada indicated that construction activities would take place in winter, the off-season for tourism.

The Rapid City Loop will cross Lake Wahtopanah, which is another important recreational area. To minimize the impact on the lake and its users, TransCanada proposed to conduct the crossing during the winter drawdown period.

Cumulative Environmental Effects

TransCanada conducted an assessment of the cumulative and residual effects of their proposal, which could accumulate or interact with the environmental effects of other projects that have been or will be carried out in the vicinity. The environmental effects considered are related to agriculture, forestry, wetlands, watercourses and fisheries habitat.

One of the land categories present along the proposed pipeline routes is agricultural lands. TransCanada submitted that agriculture on the prairie has resulted in degraded soils, contaminated water and reduced biodiversity. The great majority of the natural vegetation of the area has been cleared for agriculture. This has had a large impact on the region's wildlife populations. Impacts of pesticide and fertilizer application, organic matter loss, salinization, compaction, and increased wind and water erosion due to agriculture have all contributed to soil degradation.

A second land category present along the proposed pipeline routes is forested lands. Pipeline expansion projects normally involve the clearing of trees and a reduction in overall tree cover. The main issues related to increases in permanent right-of-way easement through forested areas is the potential for loss in habitat for resident wildlife species, fragmentation of habitat or alteration to movement corridors and a reduction in area of undisturbed native plant communities. Since forested areas are not reclaimed to pre-disturbance conditions following construction, the land is therefore altered by the expansion.

Wetlands in the areas of the proposed looping projects provide habitat for waterfowl and represent some of the only unaltered areas with respect to native vegetation communities. Furthermore,

wetlands provide water storage and control functions which contribute to erosion and flood control, and improvement of water quality.

With respect to watercourses and fisheries habitat, TransCanada submitted that the potential effects associated with increasing the width of right-of-way clearance at water crossings include the reduction of overhead cover and streamside vegetation which may impact bank stability, fish, and fish habitat; increased exposure to direct sunlight may potentially alter water temperature regimes. Further, some impacts during stream crossings such as temporary disruption of habitat by trench excavation, turbidity generation and siltation during in-stream construction, will be unavoidable.

For the Saskatchewan facilities, TransCanada stated that the main commercial activity undertaken within the area of the proposed expansion is agriculture. The remaining natural communities consist of ponds, sloughs, small areas of native grass lands and small copses of aspen. Other land uses in the region include linear facilities such as roads, railways, pipelines and transmission lines as well as residential and other small pockets of urbanization. Existing disturbances in the study area are limited to the pipeline right-of-way alongside which the proposed pipelines will be built. TransCanada submitted that by implementing the identified mitigative measures outlined in the Environmental and Socio-Economic Assessment report for the Saskatchewan facilities for each loop section, and reclaiming the right-of-way following construction, no appreciable loss in soil productivity is expected as a result of the proposed looping projects. TransCanada stated that there are no permanent losses in agricultural lands expected as result of the proposed expansion.

Forested land is also present along the proposed pipeline routes in Saskatchewan. The potential alteration to the small areas of forested lands is unlikely to cause reductions in survival or reproduction for any wildlife species which use the areas along the proposed right-of-way. As a result, TransCanada submitted that no significant effects are anticipated as a result of the potential alteration to forested areas along the proposed looping projects in Saskatchewan. The Wildlife Branch of SERM expressed concerns over the potential cumulative effects of loss of habitat through two designated wildlife areas within the Wapella Loop. TransCanada stated that they would be discussing the routing, construction schedule and restoration techniques with Saskatchewan officials and has indicated that the pipeline could be constructed with a minimal and insignificant impact on the habitat. TransCanada agreed to provide the Board with updated information regarding construction activities for this area.

Due to the identified importance of wetlands in southern Saskatchewan, TransCanada submitted that by implementing the identified mitigative measures outlined in the Environmental and Socio-Economic Assessment report for the Saskatchewan facilities, it will ensure there are no residual losses in wetland habitats associated with the proposed expansion project. Further, due to the limited number of water crossings in the proposed Saskatchewan pipeline looping program and non-sensitive nature of the watercourses crossed, TransCanada submitted that it is unlikely that the proposed expansion program will cause any decrease in habitat suitability for fish.

Contact with representatives from Saskatchewan Rural Development indicates that planned developments in the area of the proposed looping projects are scarce. The only development projects which were identified in the area of the proposed facility expansions were a grain elevator proposed on the TransCanada Highway, 3 km west of Moosomin, and the recently constructed TransGas storage facilities, east of Moosomin. These proposed and existing facilities do not overlap with areas of the proposed Wapella and Moosomin Loops.

With respect to the socio-economic setting of the Saskatchewan project area, TransCanada submitted that no long-term impacts are anticipated from the proposed pipeline expansion, other than an incremental increase in the lands available for cultivation and grazing, and an increase in tax base for local municipalities.

For the Manitoba facilities, TransCanada stated that the main commercial activity undertaken within the area of the proposed expansion is agriculture. The remaining natural communities consist of ponds, sloughs, and small copses of aspen and bur oak. Only in the Camp Lake Loop, which traverses areas of Canadian Shield, are extensive tracts of natural vegetation left. Here, jack pine and aspen forests predominate on upland sites and black spruce bogs are most common on poorly drained sites. Other land uses in the region include linear facilities such as roads, railways, pipelines and transmission lines as well as residential and other small pockets of urbanization. Existing disturbances in the study area are limited to the pipeline right-of-way alongside which the proposed pipelines will be built.

TransCanada indicated that as the rights-of-way can be reclaimed without any appreciable loss in soil productivity, losses for agricultural lands are not expected. Further, since forested areas are not reclaimed to pre-disturbance conditions following construction, the land is therefore altered by the expansion. TransCanada suggested that from a regional perspective, the area of undisturbed forest within the vicinity of the Camp Lake loop is large in comparison to the proposed forest cover reduction necessary for this loop. In addition, since the TransCanada Highway is located in close proximity to the proposed pipeline, there is limited concern regarding potential habitat fragmentation related to the pipeline looping project. TransCanada submitted that due to these considerations, the alteration of forested lands in the areas of the proposed Manitoba looping projects is unlikely to cause reductions in survival or reproduction for any wildlife species which use the areas along the proposed right-of-ways. TransCanada stated that no significant effects are anticipated as a result of the potential alteration to forested areas along the proposed loops in Manitoba.

Due to the identified importance of wetlands in southern Manitoba, TransCanada submitted that by implementing the identified mitigative measures outlined in the Environmental and Socio-Economic Assessment report for the Manitoba facilities, it will ensure there are no residual losses in wetland habitats associated with the proposed expansion project.

Due to the limited number of watercourse crossings in the proposed Manitoba pipeline looping program and the less sensitive nature of the watercourses crossed, TransCanada submitted that it is unlikely that the proposed expansion program will cause any decrease in habitat suitability for fish. The Fisheries Branch of Manitoba Natural Resources expressed concerns for the potential long-term cumulative effects on fisheries of the crossing of Lake Wahtopanah. To respond to the concerns of Manitoba Natural Resources, TransCanada commissioned more detailed studies of the potential impacts to Lake Wahtopanah as a result of the proposed drawdown and crossing of the lake. TransCanada agreed to accept the crossing conditions required by Manitoba Natural Resources and will continue to develop further contingency plans and mitigative measures in consultation with Manitoba Natural Resources' Fisheries Branch staff.

Contact with Manitoba Rural Development and Manitoba Environment indicates that planned developments in the area of the proposed looping projects are scarce. In order to facilitate traffic levels, a twinning project has been identified in Manitoba Highways and Transport's planning horizon

for sections of the TransCanada Highway in Whiteshell Provincial Park. The proposed expansion of highway facilities will occur in close proximity to sections of the proposed Camp Lake Loop. Scheduling for the proposed highway twinning project is on a 20 year planning horizon; the timing of the project is based on government priorities and funding considerations.

With respect to the socio-economic setting of the Manitoba project area, no long-term impacts are anticipated from the proposed pipeline expansion, other than an incremental increase in the lands available for cultivation and grazing, and an increase in tax base for local municipalities.

For Northern Ontario facilities, TransCanada indicated that the construction of the loops will result in the transformation of portions of forest lands to open fields in the new easement and temporary work space areas. The establishment of additional right-of-way easement will result in permanent transformation to open field. Natural regeneration of the temporary work space area over a number of decades should result in restoration of forest habitat. TransCanada indicated that the cumulative effects of clearing forested lands for loop construction relate to the permanent removal of these lands from forestry production. TransCanada indicated that the areas to be cleared along the TransCanada right-of-way for the proposed looping are very small compared to the extensive tracts of forest adjacent to the loops, or the areas recently harvested or proposed for harvest in the vicinity of the loops. Therefore, TransCanada submitted that the cumulative effects are expected to be negligible. Similarly, the reductions in forested area serving as wildlife habitat are small in scale from a regional perspective and therefore are unlikely to have a measurable effect on wildlife populations. TransCanada stated that construction of the proposed loops along the existing right-of-way should not alter the forest edge habitat conditions.

Environment Canada provided specialist advice which addressed cumulative effects on the forested landscape and associated wetland loss, for the Ontario portion including the nine proposed pipeline loops in Northern Ontario. TransCanada stated that their mitigative measures address the objectives of both the Ontario Wetland Policy Statement (1992) and the Federal Policy on Wetland Conservation (1992). TransCanada indicated that its mitigative measures for wetland construction have been proven to successfully return wetland areas to their pre-construction condition and therefore no cumulative effects with respect to wetland loss are expected.

TransCanada indicated that only a narrow treed buffer exists between the right-of-way and parallel shoreline of the Kenogamisis River along the upstream approach. TransCanada submitted that the permanent loss of this riparian vegetation due to expansion of the right-of-way may have a cumulative effect due to incremental loss of riparian canopy. TransCanada proposed that this loss can be mitigated by the restoration of riparian and in-stream vegetation in the right-of-way crossing area. For the temporary work space, rapid recovery of riparian vegetation along the stream banks can be expected by natural revegetation or replanting. On the basis of the above discussion, TransCanada submitted that the cumulative effects of pipeline loop construction on fisheries habitat are considered to be not significant.

In contrast to southern Ontario where wetland loss is a significant concern, bogs throughout Northern Ontario are generally extensive and well-dispersed. None of the wetlands to be crossed by the proposed loops have been designated as Provincially Significant Wetlands or as being environmentally sensitive. TransCanada stated that the implementation of the proposed mitigative measures to ensure no loss of wetland function would minimize the potential for any cumulative effects.

For the Ontario facilities, the only development projects which were identified in the area of the proposed facility expansions were allocations of forest cut blocks, as a part of the Forest Management Plan in the area of the Gulliver River, Martin, Eaglehead and Seagull Lake Loops, and forest cut blocks as part of the Timber Management Plan in the area of the Geraldton and Longlac Loops. In addition, there is a proposed 37 MW natural gas-fired electrical generating facility at TransCanada Compressor Station 102 (start of Cochrane Loop). TransCanada reported that OMNR in their Forest Management Plans has considered cumulative effects of the allocation of wood resource in nearby harvest blocks including a consideration of biodiversity and sustainability.

With respect to the socio-economic setting of the project area, TransCanada stated that periodic loop construction could be considered to have a positive cumulative effect on the local economies. In addition, the completed pipeline loops will result in an increase in tax revenues paid annually to the Ontario Ministry of Revenue, again resulting in a positive cumulative effect.

Finally, TransCanada stated that implementing its various mitigative measures would ensure that the potential for, and significance of, cumulative effects due to the construction of the proposed loops in Saskatchewan, Manitoba and Northern Ontario are expected to be negligible.

Views of the Board

The Board is satisfied with the environmental and socio-economic information provided by TransCanada with regard to the potential adverse environmental effects which may result from the construction and operation of the proposed facilities and is satisfied with TransCanada's proposed monitoring and mitigative measures.

The Board notes, in respect of undertakings between TransCanada and the OPCC, that an undertaking made between parties is an agreement not involving the Board. Where the public interest is served, however, the Board may reference the subject matter of such undertakings in conditions to a Board-issued certificate. That reference allows the Board, either on its own, or in response to an interested party, to take such measures as may be required to enforce compliance with the conditions. Nevertheless, undertakings made between the parties involved would remain a matter between those parties.

The Board does not view its role as being one of final arbiter in (a) determining what undertakings parties should agree to; or (b) resolving disputes concerning accepted undertakings when they do not pertain to the Board's mandate or where the undertakings are not referenced in Board-issued certificate conditions. However, if the Board finds the public interest would be served, it may impose certificate conditions which take into account the subject matter found in such undertakings, whether accepted or not.

With respect to the matters at hand, the Board concludes that TransCanada has not accepted any of the undertakings which OPCC requested during the GH-3-95 proceedings. The Board, however, finds the subject matter contained in this year's OPCC undertakings, specifically Undertakings 1 to 16, as being in the public interest and should be included as a Board-imposed certificate condition. The wording of this condition is found in the attached Condition 4. The Board is not satisfied that OPCC

has sufficiently demonstrated the need for the Board to impose as a condition the subject matter contained in Undertaking 17[3].

The Board is satisfied with the environmental information provided by TransCanada with regard to the potential adverse environmental effects which may result from the addition of compressors at Stations 17, 92 and 110. The addition of the electric powered compressor at Station 17 will not contribute to NO_X emissions in the vicinity of that station. The addition of 28.3 MW compressors at Stations 92 and 110 will contribute to a reduction in ground level concentrations of NO_X in the vicinity of those stations if the stations are operated in the configuration proposed. The Board anticipates that when dry, low NO_X burners are installed on the new compressors, ground level NO_X concentrations will be further reduced, and that such an installation will contribute to Canada's commitment to reduce NO_X emissions. The Board encourages TransCanada to proceed with the installation of dry, low NO_X compressors according to the plan submitted by TransCanada.

The Board acknowledges receipt of TransCanada's document entitled "Preliminary Action Plan for the Voluntary Climate Change Challenge".

The Board is satisfied with the cumulative effects information provided by TransCanada and is of the view, based on TransCanada's assessment, its response to IRs, proposed mitigative measures, and through consultation with selected government agencies, that the environmental effects of the proposed construction, in combination with past, existing, and future projects and activities, are not likely to cause significant adverse cumulative environmental effects.

The Board is of the view that if TransCanada's proposed environmental mitigative measures as well as those agreed to by TransCanada with other regulatory agencies are implemented, and if TransCanada proceeds with the installation of dry, low NO_X compressors according to the plan submitted, the project is not likely to cause significant adverse environmental effects. Should TransCanada's application be approved, the Board would condition the certificate to ensure adherence to mitigative measures and undertakings, as submitted during the GH-3-95 proceedings, and to ensure that unresolved issues are adequately addressed prior to construction.

[3] Undertaking 17, proposed by the OPCC, was as follows: "In addition to complying with the requirements of these Undertakings, TCPL shall comply with all applicable federal and provincial laws."

Chapter 6

Economic Feasibility

The Board examines the economic feasibility of facilities by assessing the likelihood that the facilities will be used at a reasonable level over their economic life, and by determining whether the demand charges will be paid. In the course of its examination, the Board considers several factors, all of which were addressed in TransCanada's evidence.

TransCanada submitted a report by Sproule which concluded that there will likely be a sufficient long-term gas supply to keep the pipeline, including the subject facilities, utilized at a reasonable level over its economic life.

TransCanada projected that gas demand in Manitoba, Ontario and Quebec will grow at an average annual rate of 1.9 percent over the forecast period 1993 to 2010. TransCanada estimated that gas demand in Ontario and Quebec will exceed contracted pipeline requirements by some 7 900 10^6m^3 (279 Bcf) in 2004, requiring the construction of additional pipeline capacity beyond that applied for and/or additional gas imports.

To demonstrate the long-term nature of gas demand in the U.S. Midwest and U.S. Northeast markets served by its pipeline system, TransCanada presented several long-term gas demand forecasts which showed that annual growth rates, over the forecast period 1995 to 2010, will range between 0.17 and 1.16 percent in the U.S. Midwest and between 1.24 and 1.52 percent in the U.S. Northeast.

TransCanada indicated that in all three market areas served (i.e. Eastern Canada, U.S. Midwest and U.S. Northeast), the industrial and electric power generation market sectors are driving the increases in gas demand. TransCanada acknowledged however, that uncertainties exist in the non-utility generation markets in both Canada and in the U.S. caused, in part, by future technological advances, including those associated with clean coal technology, overall economic growth, and the move toward deregulation of the electricity sector.

TransCanada concluded, however, that despite market and regulatory uncertainties there will continue to be a long-term need for gas in the markets that it serves.

TransCanada and its expansion shippers provided evidence indicating that, for the new firm transportation service contracts underpinning the expansion: the transportation demand charges will be paid; there is adequate gas supply; upstream and downstream transportation arrangements are or will be in place; and, all regulatory approvals have or will be obtained.

TransCanada anticipated that the toll impact resulting from the expansion would be minimal and would have no material impact on the demand for its services.

Views of the Board

The Board is satisfied that the evidence demonstrates that the applied-for facilities are economically feasible, given the existence of long-term gas supply and demand, and a

strong likelihood that the facilities will be used at a reasonable level over their economic life and that the demand charges will be paid.

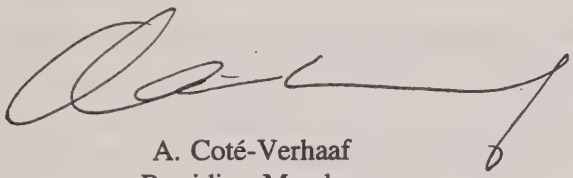
The Board is also satisfied that the certificate conditions described in the preceding Chapter will ensure that all necessary gas supply and transportation service contracts and regulatory approvals will be in place prior to the commencement of construction of the applied-for facilities.

Chapter 7

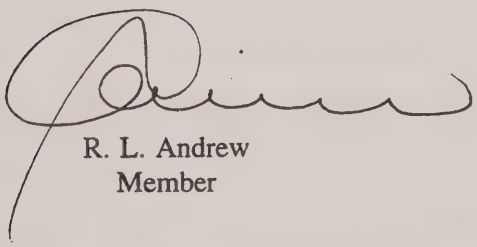
Disposition

The foregoing Chapters constitute our Decisions and Reasons for Decision in respect of the application heard before the Board in the GH-3-95 proceedings. The Board has found that the proposed facilities are required by the present and future public convenience and necessity. Therefore, the Board will recommend to the Governor in Council that a certificate be issued. The certificate will be subject to the conditions outlined in Appendix II with the exception of those facilities, listed in Table 4-2, which are exempt from conditions 12 and 13.

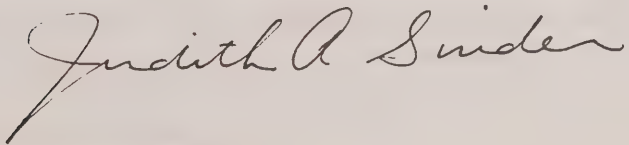
Upon issuance of a certificate, the Board will exempt the applied-for facilities, pursuant to section 58 of the Act, from paragraphs 31(c), 31(d), 33 and 47 of the Act subject to the exemption order condition in Appendix II.



A. Coté-Verhaaf
Presiding Member



R. L. Andrew
Member



J. Snider
Member

Calgary, Alberta
November 1995

Appendix I

List of Issues

ECONOMIC FEASIBILITY

1. The likelihood of the facilities being used at a reasonable level over their economic life and a determination of the likelihood of the demand charges being paid, having regard to, *inter alia*:
   a) evidence that there is likely to be a sufficient long-term supply of gas to keep the pipeline fully utilized over its economic life;
   b) evidence on the long-term outlook for gas demand in the market region to be served;
   c) evidence on the individual gas contracts underpinning the expansion, including:
      (i) evidence that the demand charges will be paid;
      (ii) evidence as to the adequacy of project-specific supply for the proposed expansion;
      (iii) evidence that adequate gas transportation arrangements exist or will exist both upstream and downstream from the TransCanada system;
      (iv) evidence that all appropriate regulatory approvals in both Canada and the United States will be in place prior to construction of the new facilities; and
   d) the likelihood of a toll increase caused by the expansion resulting in reduced demand for firm service on the system.

TECHNICAL ISSUES

2. The appropriate design of the proposed facilities and the consistency of that design with the long-term requirements.

ENVIRONMENTAL ISSUES

3. The potentially adverse environmental and socio-economic effects of the proposed facilities, including those factors outlined in section 16 of the *Canadian Environmental Assessment Act*.

4. The appropriateness of the location of the proposed facilities and the land rights acquisition process.

5. The adequacy of the public notification process.

TERMS AND CONDITIONS

6. The appropriate terms and conditions to be included in any certificate or order that may be issued.

Appendix II

Certificate Conditions

1. The pipeline facilities in respect of which this certificate is issued shall be the property of and shall be operated by TransCanada.

2. Unless the Board otherwise directs:

   (a) TransCanada shall cause the approved facilities to be designed, manufactured, located, constructed and installed in accordance with those specifications, drawings and other information or data set forth in its application, or as otherwise adduced in evidence before the Board, except as varied in accordance with subsection (b) hereof; and

   (b) TransCanada shall cause no variation to be made to the specifications, drawings or other information or data referred to in subsection (a) without the prior approval of the Board.

3. Unless the Board otherwise directs, TransCanada shall implement or cause to be implemented all of the policies, practices, recommendations and procedures for the protection of the environment ("hereinafter referred to as Environmental Protection Standards") included in or referred to in its application, its environmental reports filed as part of its application, its Pipeline Construction Specifications (1993), its Environmental Management Handbook (1995), and its undertakings made to other government agencies, or otherwise adduced in the evidence before the Board in the GH-3-95 proceeding, with the exception of minor adjustments or changes to these recommendations and practices which may be required as a result of landowner preference or site conditions at the time of construction. Minor amendments to practices, procedures and recommendations may be implemented provided they have first been reviewed by TransCanada's on-site Environmental Inspector and meet the aforementioned Environmental Protection Standards. Where appropriate, TransCanada shall consult with local authorities and/or landowners prior to the implementation of any minor change or amendment. TransCanada shall provide the Board with a detailed listing of all minor changes or amendments when it files the Post Construction Environment Report.

4. For facilities to be constructed in Ontario, and unless the Board otherwise directs, TransCanada shall:

   (a) consult with the local Ontario Ministry of Natural Resources ("OMNR") District Manager or designate, and obtain and adhere to all authorizations required by OMNR. These authorizations may be in the form of work permits and may apply to all construction on Crown Land, shorelands, and at all water crossings for pipeline and temporary and permanent vehicle crossings and associated activities, within the TransCanada Right-of-Way and temporary work areas.

   TransCanada shall apply for such authorization no later than thirty (30) days prior to the time of proposed construction.

TransCanada shall also advise parties undertaking construction, work or activities outside of the TransCanada Right-of-Way and temporary work areas associated with TransCanada facilities to obtain any necessary OMNR authorization for activities (eg. access roads, aggregate sources) as early as possible prior to proceeding with any construction, works or activities.

Should the method of and mitigation associated with a proposed water crossing or other proposed works or activities not be to OMNR's satisfaction, the proposed water crossing, work or activity shall not proceed until OMNR's concerns are satisfactorily addressed.

(b) include the following in its applications for activities other than permanent water crossings or off easement work, to the local OMNR District Manager or designate for OMNR authorization, unless OMNR determines such information is not required:

(i) a completed OMNR Work Permit Form Page 1;

(ii) a completed OMNR Schedule A (Fire) form;

(iii) additional schedules identifying proposed crossings of watercourses or waterbodies which appear on at least 1:50,000 National Topographic Service ("NTS") maps including:

(a) a list of all dry pipeline water crossings (flume);
(b) a list of all dry pipeline water crossings (block and pump);
(c) a list of all wet pipeline water crossings; and
(d) a list of all temporary vehicle water crossings;

(iv) a map identifying all water crossings by TransCanada's MLV and watercourse name;

(v) a fisheries assessment;

(vi) for dry water crossings, site-specific information such as flows and flume sizes and locations, as appropriate to supplement typical drawings; and

(viii) for vehicle crossings, the length and span of bridges, the length and diameter of culverts and location of fords, as appropriate to supplement typical drawings; this information will be provided at a later date, and prior to the commencement of construction.

(c) adhere to the Ontario Generic Sediment Control Plans prepared by OMNR, February 1992 (Revised February 1993), and as amended from time to time in consultation with TransCanada, for the construction, use and removal of dry flume water crossings, dam and pump water crossings and temporary vehicle water crossings for all water crossings of water courses and waterbodies which appear on at least 1:50,000 (NTS) maps, unless OMNR determines that site-specific detailed plans of construction and sediment control are required.

TransCanada shall adhere to standard TransCanada procedures including the Environmental Management Handbook (1995), for pipeline and vehicle water crossings of watercourses or waterbodies which do not appear on at least 1:50,000 (NTS) maps, unless OMNR determines

that the plans noted above or site-specific detailed plans of construction and sediment control are appropriate for specific water crossings.

(d) for each "wet" pipeline and permanent vehicle crossing of a watercourse or of a waterbody which appears on at least 1:50,000 (NTS) maps, submit to OMNR, no later than twenty-one (21) days prior to the time of proposed construction, site-specific detailed plans of construction and sediment control, unless OMNR determines typical drawings would be sufficient. These plans shall be in accordance with OMNR's March 1993 guidelines; Sediment Control Plans For Wet Crossings, General Conditions TransCanada PipeLines, and as amended from time to time in consultation with TransCanada.

(e) at least 48 hours prior to the environmental seminars for on-site supervisory construction personnel, notify the local office of the Ministry of Environment and Energy ("MOEE"), the OMNR District Manager or designate and the chair of the OPCC of the date, time and place of the environmental seminar and provide the names of the Construction Supervisor and Field Environmental Inspector.

(f) provide notice to the local OMNR District Manager or designate at least 48 hours prior to construction at each water crossing and notice within five (5) days of completion of construction at each water crossing. Notices are to be provided during normal office hours. OMNR shall be advised by TransCanada at the earliest possible time of any timing changes after notice has been given.

(g) provide the local MOEE District Office with a construction schedule. Where water crossings are to be constructed in advance of the schedule, TransCanada shall advise the MOEE District Office of the water crossing a minimum of 48 hours in advance.

(h) (i) obtain the appropriate authorization under the *Fisheries Act* from the Department of Fisheries and Oceans ("DFO") prior to construction, should OMNR and/or DFO be of the opinion that such authorization is required as a result of intended actions of TransCanada; and

(ii) advise OMNR as early as possible of any undertakings or actions that may be expected to require DFO authorization such as proposed wet crossings which may affect critical fish spawning/incubation, and allow for sufficient lead time for DFO authorization as required prior to construction.

(i) comply with any restrictions placed on the timing of site preparation or construction activities, as included in the OMNR authorization, with respect to fisheries and fire protection.

(j) have TransCanada's Construction Supervisor or designate immediately notify the local OMNR District Manager or designate, as identified in the OMNR authorization, of the introduction of a significant amount of sediment or other materials into a waterbody or watercourse or failure of any mitigation measures and any measures undertaken as a result of these situations. Where possible these and subsequent measures shall be determined by the TransCanada's Construction Supervisor or designate in consultation with the OMNR District Manager or designate.

(k) provide directly to the local OMNR District Manager, for information purposes, a copy of any applicable Post-Construction and As-Built reports.

(l) dispose construction debris, excluding tree stumps and rip rap, at approved landfill sites.

(m) monitor all water wells within 100 m of proposed blasting location for quality and quantity.

(n) advise the local MOEE District Office of all complaints regarding adverse effects on water wells from blasting and the resolution of such complaints upon their resolution.

(o) provide, should construction interfere with any water supplies, clear potable water of sufficient quantity or adequate filtration equipment to meet the current household requirements of all parties that are affected.

(p) conduct, in areas of known or suspected contamination, soil tests and analysis for proposed excavation sites at water crossings.

Prior to Commencement of Construction

5. Unless the Board otherwise directs, TransCanada shall, at least 5 working days prior to the commencement of construction of any stream crossings, submit, for Board approval, additional information regarding these stream crossings. The additional information shall set out:

   (a) construction designs of the crossing;

   (b) in-stream timing restrictions;

   (c) site-specific mitigative and restorative measures to be employed as a result of undertakings to regulatory agencies;

   (d) evidence to demonstrate that all issues raised by regulatory agencies have been adequately addressed, including all necessary updates to the environmental assessments where deficiencies have been identified; and

   (e) status of approvals, including environmental conditions.

6. Unless the Board otherwise directs, TransCanada shall, at least 10 days prior to the commencement of construction of the approved facilities, file with the Board a detailed construction schedule or schedules identifying major construction activities and shall notify the Board of any modifications to the schedule or schedules as they occur.

7. Unless the Board otherwise directs, TransCanada shall, at least 10 days prior to the commencement of construction of the approved facilities, file with the Board the results of the heritage resource surveys referred to in the application, including any corresponding avoidance or mitigative measures.

8. Unless the Board otherwise directs, TransCanada shall, prior to the commencement of construction, file with the Board copies of any provincial permits or authorizations which contain

environmental conditions for the applied-for facilities. In addition, TransCanada shall maintain an information file(s) in the construction office(s) which would include any changes made in the field and permits obtained following the commencement of construction.

9. Unless the Board otherwise directs, TransCanada shall, prior to the commencement of construction, file with the Board an update of the summary detailing the results of discussions with all appropriate special interest groups and regulatory agencies. In addition, TransCanada shall maintain an information file(s) in the construction office(s) which includes:

   (a) a detailed listing of all site-specific mitigative measures to be employed as a result of undertakings to special interest groups or regulatory agencies; and

   (b) an explanation of any constraints identified that may affect the construction program.

10. Unless the Board otherwise directs, TransCanada shall, prior to the commencement of construction:

   (a) serve the heritage resource surveys on the Governments of Saskatchewan, Manitoba and Ontario;

   (b) seek the opinion of each provincial government described in subsection (a) above, concerning the acceptability or non-acceptability of the heritage resource surveys; and

   (c) advise the Board of the respective opinions of each provincial government described in subsection (a) above, or of the Applicant's inability to obtain an oral or written opinion from one or more of the provincial governments described in subsection (a) above.

11. Unless the Board otherwise directs, TransCanada shall, at least 15 days prior to the commencement of the hydrostatic testing portion of the project in Ontario, submit for Board approval additional information regarding standard conditions or specific mitigative measures that TransCanada intends to use for hydrostatic testing.

12. Unless the Board otherwise directs, TransCanada shall, prior to the commencement of construction of the approved facilities, demonstrate to the Board's satisfaction that:

   (a) in respect of new firm export volumes, all necessary United States and Canadian federal regulatory approvals, including applicable long-term Canadian export authorizations, have been granted; and

   (b) in respect of the transportation services of new firm volumes on the TransCanada system:

      (i) transportation contracts have been executed;

      (ii) all necessary United States and Canadian regulatory approvals have been granted in respect of any necessary downstream facilities or transportation services; and

      (iii) gas supply contracts have been executed.

13. Unless the Board otherwise directs, TransCanada shall, prior to the commencement of construction of any of the approved facilities, submit for Board approval:

    (a) requirements tables in the same format as Tables 2, 3 and 5 of Subtab 1 under the Tab "Requirements" of Exhibit B-1 of the GH-3-95 proceeding, showing the base case requirements and those requirements for which Condition 12 has been satisfied; and

    (b) flow schematics of the TransCanada system demonstrating that those approved facilities which are to be released for construction are necessary to transport the requirements referred to in subsection (a).

During Construction

14. Unless the Board otherwise directs, TransCanada shall, during construction, ensure that specialized habitat for wildlife and plants with a designated status will be avoided, relocated or restored in consultation with appropriate regulatory agencies.

15. Unless the Board otherwise directs, TransCanada shall file with the Board, prior to seeding, any variations in the recommended seed mixes as outlined in the assessment reports, unless these changes are requested by the landowner.

16. Unless the Board otherwise directs, TransCanada shall, during construction, file with the Board monthly construction progress and cost reports, in a format to be determined through consultation with Board staff, providing a breakdown, by location and facility, of costs incurred during that month, the percentage of each activity which has been completed and an update of costs to complete the project.

17. TransCanada shall, during construction, maintain for audit purposes at each construction site, a copy of the welding procedures and non-destructive testing procedures used on the project together with all supporting documentation.

Post Construction

18. Unless the Board otherwise directs, TransCanada shall, within six months of putting the additional facilities into service, file with the Board a report providing a breakdown of the costs incurred in the construction of the additional facilities, in the format used in Schedules 4 through 15 of Subtab 9 under Tab "Facilities" of Exhibit B-1 of the GH-3-95 proceeding, setting forth actual versus estimated costs, including reasons for significant differences from estimates.

19. Unless the Board otherwise directs, TransCanada shall file with the Board, a post-construction environmental report within six months of the date that each new facility is placed in service. The post-construction environmental report shall set out the environmental issues that have arisen up to the date on which the report is filed and shall:

(a) provide a description of all minor amendments to practices, procedures and recommendations (as referred to in Condition 3) which have been implemented during the construction process;

(b) indicate the issues resolved and those unresolved; and

(c) describe the measures TransCanada proposes to take in respect of the unresolved issues.

20. Unless the Board otherwise directs, TransCanada shall file with the Board, on or before the 31 December that follows each of the first two complete growing seasons following the filing of the post-construction environmental report referred to in Condition 19:

(a) a list of the environmental issues indicated as unresolved in the report and any that have arisen since the report was filed; and

(b) a description of the measures TransCanada proposes to take in respect of any unresolved environmental issues.

Expiration of Certificate

21. Unless the Board otherwise directs prior to 31 December 1997, this certificate shall expire on 31 December 1997 unless the construction and installation with respect to each of the additional facilities has commenced by that date.

EXEMPTION ORDER CONDITION

1. TransCanada, prior to the commencement of any specific loop section referred to in this Order, except as provided in subsection (b), shall:

(a) demonstrate to the satisfaction of the Board that all required land rights have been obtained along the entire loop section; and

(b) in the event that all required land rights have not been acquired within a specific loop section referred to in this Order, any portion or portions thereof may be constructed provided that, prior to commencing of construction on any portion or portions of the loop section, TransCanada shall demonstrate to the satisfaction of the Board that the rights, as prescribed in the Act, of the landowners along the portion or portion of the loop section for which TransCanada has not yet obtained the required land rights, will not be prejudiced by the construction of the portion or portions of the loop section.

Appendix III

Table A3-1
Locations and Recommended Mitigation for Rare Plants Found Along the Pipeline Loop Sections Surveyed for the 1996-1997 Facilities Application

Plant	Loop	Location	Recommended Mitigation
Cypripedium calceolus Yellow lady's - slipper	Wapella	MLV 23 + 1.27 km to 3.40 km	Narrow down as much as possible throughout the segment.
Cypripedium calceolus Yellow lady's - slipper	Wapella	MLV 23 + 11.42 km to 13.15 km	Narrow down as much as possible throughout the segment.
Cypripedium calceolus Yellow lady's - slipper	Moosomin	MLV 24 + 19.0 km (± 10 m)	To be determined in consultations with Regional Biologist.[1]
Cypripedium calceolus Yellow lady's - slipper	Moosomin	MLV 24 + 21.2 km to 21.4 km	Narrow down as much as possible throughout the segment.
Cypripedium calceolus Yellow lady's - slipper	Rapid City	MLV 29 + 3.31 km to 3.60 km	Narrow down in bush only.
Cypripedium calceolus Yellow lady's - slipper	Rapid City	MLV 29 + 11.60 km to 11.75 km	Narrow down in bush only.
Cypripedium calceolus Yellow lady's - slipper	Firdale	MLV 32 + 2.2 km to 3.7 km	Narrow down throughout the segment.
Orobanche ludoviciana Louisiana Broomrape	Firdale	MLV 32 + 4.33 km to 4.40 km	Narrow down throughout the sand dune area.
Cypripedium calceolus Yellow lady's - slipper	Firdale	MLV 32 + 20.1 km to 20.3 km	Narrow down in bush.
Pinus resinosa Red pine	Spruce	MLV 43 + 0.45 km to 0.62 km	Narrow down as much as possible throughout the segment.[2]
Cypripedium sp. Lady's-slipper orchid	Spruce	MLV 43 + 1.36 km (±10 m)	Transplant in consultation with Regional Biologist.
Pinus resinosa Red pine	Spruce	MLV 43 + 4.85 km to 4.90 km	Narrow down as much as possible throughout the segment.[2]

[1] Mitigative options include transplanting, fencing off or narrowing down.

[2] Environmental Inspector should be on site during surveying and clearing to pinpoint the areas of concern and to develop site-specific mitigation (avoiding individuals/populations where possible), in consultation with Regional Biologist.

Table A3-1
Locations and Recommended Mitigation for Rare Plants Found Along the Pipeline Loop Sections Surveyed for the 1996-1997 Facilities Application (cont'd)

Plant	Loop	Location	Recommended Mitigation
Pinus resinosa Red pine	Spruce	MLV 43 + 4.97 km to 5.05 km	Narrow down as much as possible throughout the segment.[2]
Pinus resinosa Red pine	Camp Lake	MLV 45 + 0.98 km to 1.02 km	No mitigation warranted unless otherwise directed by Regional Biologist.[2]
Cornus rugosa Spotted dogwood	Camp Lake	MLV 45 + 9.23 km to 9.27 km	No mitigation warranted unless otherwise directed by Regional Biologist.[2]
Cornus rugosa Spotted dogwood	Camp Lake	MLV 45 + 9.40 km (±10 m)	No mitigation warranted unless otherwise directed by Regional Biologist.[2]
Pinus resinosa Red pine	Camp Lake	MLV 45 + 11.97 km to 12.03 km	No mitigation warranted unless otherwise directed by Regional Biologist.[2]
Cornus rugosa Spotted dogwood	Camp Lake	MLV 45 + 13.0 km (±25 m)	No mitigation warranted unless otherwise directed by Regional Biologist.[2]
Cornus rugosa Spotted dogwood	Camp Lake	MLV 45 + 14.0 km (±25 m)	No mitigation warranted unless otherwise directed by Regional Biologist.[2]
Ostrya virginiana Hop hornbeam	Camp Lake	MLV 45 + 14.14 km to 14.22 km	Narrow down as much as possible throughout segment.[2]
Pinus strobus White pine	Camp Lake	MLV 45 + 14.22 km (±25 m)	Will be automatically mitigated by following recommended mitigation for *hop hornbeam.*
Pinus strobus White pine	Camp Lake	MLV 45 + 14.92 km (±25 m)	Avoid where possible.[2]
Pinus strobus White pine	Camp Lake	MLV 45 + 15.36 km (±10 m)	Avoid where possible.[2]
Cornus rugosa Spotted dogwood	Camp Lake	MLV 45 + 15.82 km (±25 m)	No mitigation warranted unless otherwise directed by Regional Biologist.[2]

[1] Mitigative options include transplanting, fencing off or narrowing down.

[2] Environmental Inspector should be on site during surveying and clearing to pinpoint the areas of concern and to develop site-specific mitigation (avoiding individuals/populations where possible), in consultation with Regional Biologist.

Table A3-1
Locations and Recommended Mitigation for Rare Plants Found Along the Pipeline Loop Sections Surveyed for the 1996-1997 Facilities Application (cont'd)

Plant	Loop	Location	Recommended Mitigation
Pinus strobus White pine	Camp Lake	MLV 45 + 17.02 km to 17.1 km	Avoid where possible.[2]
Pinus strobus White pine	Camp Lake	MLV 45 + 17.8 km to 17.84 km	Avoid where possible.[2]
Cornus rugosa Spotted dogwood	Camp Lake	MLV 45 + 17.88 km (±25 m)	No mitigation warranted unless otherwise directed by Regional Biologist.[2]
Cornus rugosa Spotted dogwood	Camp Lake	MLV 45 + 18.39 km (±25 m)	No mitigation warranted unless otherwise directed by Regional Biologist.[2]
Cornus rugosa Spotted dogwood	Camp Lake	MLV 45 + 18.50 km (±100 m)	No mitigation warranted unless otherwise directed by Regional Biologist.[2]

[1] Mitigative options include transplanting, fencing off or narrowing down.

[2] Environmental Inspector should be on site during surveying and clearing to pinpoint the areas of concern and to develop site-specific mitigation (avoiding individuals/populations where possible), in consultation with Regional Biologist.

Table A3-2
Observations of Fauna and/or Associated Habitat
Along TransCanada PipeLines Proposed 1996-97
Facilities Application Saskatchewan and Manitoba Facilities

Loop	Obs.	MLV (km)	Observation	Recommendation[1]
Caron	1.	12 + 22.8 km - 12 + 23.3 km	Baird's Sparrows (3+ males)	Timing constraints, minimize disturbance to native sod, use native species.
	2.	12 + 22.8 km - 12 + 23.3 km	Loggerhead Shrike (Habitat)	Minimize removal of thorny buffaloberry.
Wapella	4.	23 + 12.0 km - 23 + 12.2 km	Red-tailed Hawk (active nest 30 m to S)	Consult with Regional Wildlife Biologist (site has been flagged).
	5.	23 + 12.8 km - 23 + 13.0 km	Mountain Bluebirds (pair actively feeding)	Consult with Regional Wildlife Biologist.
Firdale	7.	32 + 3.0 km - 32 + 3.5 km	White-phase Red-tailed Hawk	Consult with Regional Wildlife Biologist.
	8.	32 + 4.3 km - 32 + 5.0 km	Plains Spadefoot Toad (one individual)	Carefully remove and relocate any amphibians from the trench or construction area.
	9.	32 + 5.6 km - 32 + 6.0 km	Pocket Gophers (Plains or Northern)	Mitigation recommended[a]
	10.	32 + 7.8 km - 32 + 8.2 km	Eastern Bluebird and Pileated Woodpecker (potential nest holes and woodpecker observed)	Minimize removal of mature poplar and snags.
Spruce	12.	43 + 0.6 km	Eastern Bluebirds (fresh nest hole in poplar snags at edge ROW)	Consult with regional Wildlife Biologist (site flagged).
	13.	43 + 2.4 km	Great Blue Heron (single bird)	Minimize riparian disturbance.
	14.	43 + 2.4 km - 43 + 2.7 km	Great Gray Owl (single bird perching at edge of ROW)	Minimize removal of poplar stand (site flagged).

[1] Avoiding construction during the sensitive nesting and breeding seasons for rare and endangered species encountered, as outlined in the Environmental and Socio-Economic Assessment, Saskatchewan and Manitoba facilities (May and June, 1995), is recommended. Consult with Regional Wildlife Biologists regarding timing constraints, buffer zones and other mitigative measures, if construction cannot be scheduled outside of the sensitive periods for the species observed.

[a] (i) habitat protection by limiting all disturbance to the right-of-way and previously established access roads, when traversing areas with native vegetation suitable for these species; and

(ii) close monitoring of the right-of-way prior to and during construction to relocate any individuals which may be at risk in active work areas.

Table A3-2
Observations of Fauna and/or Associated Habitat
Along TransCanada PipeLines Proposed 1996-97
Facilities Application Saskatchewan and Manitoba Facilities (cont'd)

Loop	Obs.	MLV (km)	Observation	Recommendation[1]
Camp Lake	15.	45 + 4.3 km - 45 + 4.5 km	Great Gray Owl (perching snags 10 m - 30 m from existing ROW)	If possible, avoid removal of perching/roosting tree.
	16.	45 + 14.7 km	Osprey (nest approximately 100 m to S on alternate pipeline access)	Avoid disturbance during active period.
	17.	45 + 15.3 km	Great Gray Owl (perching tree approximately 15 m S)	Avoid removal of perching tree.

[1] Avoiding construction during the sensitive nesting and breeding seasons for rare and endangered species encountered, as outlined in the Environmental and Socio-Economic Assessment, Saskatchewan and Manitoba facilities (May and June, 1995), is recommended. Consult with Regional Wildlife Biologists regarding timing constraints, buffer zones and other mitigative measures, if construction cannot be scheduled outside of the sensitive periods for the species observed.

Table A3-3
1996-97 Facilities Application
Saskatchewan and Manitoba Facilities
Watercourse Crossing Information

Loop	Location	Watercourse Crossed	Channel Type	Channel Width	Estimated Depth	Estimated Flow	Species/Habitats/ Fisheries Values	Proposed Crossing Method[4]	Timing Restrictions
Saskatchewan									
Caron Loop	MLV 12 + 22.2 km	Sandy (Besant) Creek	Entrenched	<2 m	<1 m	0 to 0.1 m^3/s	Rainbow trout, brook trout, white sucker, numerous cyprinids	Dry	None identified
Caron Loop	MLV 12 + 23.34 km	Caron Ditch	Entrenched	5 m	<2 m	No information	No fisheries values reported	Dry	None identified
Caron Loop	MLV 12 + 24.6 km	Thunder Creek	Unconfined	2 m	<1 m	0 to 0.1 m^3/s	Pearl dace and brook stickleback	Dry	None identified
Wapella Loop	MLV 23 + 20.6 km	Pipestone Creek	Unconfined	<5 m	<3 m	0 to 2 m^3/s	Potential spawning and nursery area for northern pike	Dry	April 15 to June 1
Moosomin Loop	MLV 24 to MLV 25	No permanent watercourses	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manitoba									
Rapid City	MLV 29 + 8.5 km	Broughton's Creek	Entrenched	<2 m	<1 m	No information	Potential spawning and nursery area for white sucker and northern pike	Dry	April 1 to June 1
Rapid City	MLV 29 + 14.37 km to MLV 29 + 15.10 km	Lake Wahtopanah (Rivers Reservoir)	N/A	Up to 600 m	Up to 5 m	No information during draw down conditions	Northern pike, yellow perch, walleye and white sucker	Wet during draw down	April 1 to June 1
Firdale Loop	MLV 32 + 8.4 km	Pine Creek	Unconfined	<7 m	<2 m	0 to 2 m^3/s	Northern pike and white sucker	Dry	April 1 to June 1
Firdale Loop	MLV 32 + 23.2 and MLV 32 + 23.5 km	West Squirrel	Unconfined	<3 m	<2 m	0 to 1 m^3/s	Northern pike and white sucker	Dry	April 1 to June 1
MacGregor Loop	MLV 33 + 23.5 km	Willow Bend Creek	Unconfined	100 m	<2 m	0 to 0.1 m^3/s	No game fish species	Dry	None identified
Ste. Anne	MLV 41 + 13.1 km	Tributary of the Seine River	Entrenched	<5 m	<2 m	No information	None reported	Dry	None identified
Ste. Anne	MLV 41 + 20 km	Seine River diversion	Entrenched	<5 m	<1 m	No information	Northern pike, white sucker, channel catfish	Dry	April 1 to June 1
Spruce Loop	MLV 43 to MLV 43 + 5.5 km	No permanent watercourses	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Camp Lake Loop	MLV 45 + 3.31 km and MLV 45 + 4.25 km	Falcon Creek	Unconfined	<7 m	<1 m	No information	Walleye, northern pike, finescale dace and fathead minnows	Dry	April 1 to June 1

[4] Erosion and Sediment plans will be developed in consultation with regional fisheries biologists.

Table A3-3
1996-97 Facilities Application
Northern Ontario Facility
Watercourse Crossing Information (cont'd)

Watercourse Name	MLV Location	Drainage Area (km^2)	Channel Type 1	Channel Width (m)	Channel Depth (m)	Flow (m^3/s)		Sensitivity 2	Fisheries Value 3	Proposed Crossing Method 4&5	Instream Timing Restriction	Fish Species Caught/Reported
						Min.	Max.					
Clearwater Bay Loop (MLV 46 to MLV 46 + 5.6 km)												
Unnamed Creek	46+ 1.4 km	0.4	I	1	0.25	<0.1	1.2	NS	N/A	R/D	N/A	None
Baubee Lake Tributary	46 + 2.1 km	0.4	I	0.5	0.2	<0.1	0.6	NS	N/A	R/D	N/A	None
Gulliver River Loop (MLV 59 to MLV 59 + 21.0 km)												
Gulliver River	59 + 7.8 km	644	SR	55	2.4	6.8	49	S	WW	W	April 1 - June 15	LC,W,NP,WS,B,YP
Martin Loop (MLV 59 + 21.0 km to MLV 60)												
Tributary to Crescent Lake	59 + 24.1 km	1.8	M	1.5	0.3	<0.1	1.4	LS	WW	D	April 1 - June 15	CM
Thunder Bay Shortcut East Loop (MLV 69 to MLV 69 + 8.5 km)												
Tributary to Starnes Lake	69 + 0.7 km	10.4	SR	2-3	0.5	<0.1	3.6	LS	WW	D	April 1 - June 15	None
Starnes Creek	69 + 2.7 km	30.3	SR	4	0.6	0.2	5.7	LS	WW	D	April 1 -June 15	NP
Tributary to Starnes Creek	69 + 4.6 km	1.3	I	2-3	0.2	<0.1	0.5	NS	N/A	R/D	N/A	None
Tributary to Eaglehead Lake	69 + 5.9 km	0.2	I	0.5	0	<0.1	0.4	NS	N/A	R/D	N/A	None
Eaglehead River	69 + 6.4 km	275	SR	35	>1	2.6	28.0	S	WW	W	April 1 - June 15	NP,W,SB,YP
Eaglehead Loop (MLV 69 + 8.5 km to MLV 71)												
Tributary to Spruce River	69 + 12.1 km	3.1	I	0.5 - 1	0.1	<0.1	2.1	NS	N/A	R/D	N/A	None
Spruce River	69 + 14.7 km	280	SR	13	1	2.7	28	S	WW/CW	W	Sept. 1 - June 15	W,NP,LW,MS
Walotka Creek	69 + 16.0 km	12.2	M	2	0.5	<0.1	4.1	LS	WW	D	April 1 - June 15	W,NP
Bite Creek	69 + 16.8 km	11	M	1-2	0.3	<0.1	3.8	LS	WW	D	April 1 - June 15	W,NP
Leckie Creek	69 + 24.5 km	76.6	SR	2-3	0.25	0.5	8.2	S	WW/CW	D	Sept. 1 - June 15	CC,MS
Leckie Creek	69 + 24.6 km	76.6	SR	2-3	0.25	0.6	8.2	S	WW/CW	D	Sept. 1 - June 15	CC,MS

Table A3-3
1996-97 Facilities Application
Northern Ontario Facility
Watercourse Crossing Information (cont'd)

Watercourse Name	MLV Location	Drainage Area (km^2)	Channel Type 1	Channel Width (m)	Channel Depth (m)	Flow (m^3/s)		Sensitivity 2	Fisheries Value 3	Proposed Crossing Method 4&5	Instream Timing Restriction	Fish Species Caught/Reported
						Min.	Max.					
Seagull Lake Loop (MLV 71 to MLV 71 + 5.8 km)												
Tributary to Seagull Creek	71 + 0.7 km	0.5	SR	3	0.25	<0.1	0.7	LS	CW	D	Sept. 1 - June 15	BT
Leckie Creek	71 + 2.4 km	93.3	SR	6	0.25	0.8	18.9	S	CW	D	Sept. 1 - June 15	BT,MS
Little Seagull Creek	71 + 4.4 km	1.8	M	1-2	0.3	<0.1	2	S	CW	D	Sept. 1 - June 15	BT,MS
Little Seagull Creek	71 + 5.0 km	2.8	SR	4	0.1	<0.1	2.8	S	CW	D	Sept. 1 - June 15	BT,MS
Geraldton Loop (MLV 80 to MLV 80 + 7.1 km)												
Kenogamisis River	80 + 5.8 km	1284.00	M	30-40	1.5	14.9	163	S	WW/CW	W	Sept. 1 - June 15	NP,B,BS,LD,W,SS,L,LW
Crib Lake Tributary	80 + 7.1 km	6.3	W	n/c	0.75	<0.1	1.7	LS	WW	W	April 1 - June 15	BS,ID,FM,NP
Longlac Loop (MLV 80+ 7.1 km to MLV 80 + 13.8 km)												
Crib Lake Tributary	80 + 7.1 km	6.3	W	n/c	0.75	<0.1	1.7	LS	WW	W	April 1 - June 15	BS,ID,FM,NP
Kenogami River Tributary	80 + 10.5 km	5.7	W	1	0.3	<0.1	0.6	LS	WW	W	April 1 - June 15	BSB, NRD
Cochrane Loop (MLV 102 to MLV 102 + 6.1 km)												
Wicklow River Tributary	102 + 0.1 km	2.5	M	1.0	0.25	<0.1	1.9	LS	WW	D	April 1 - June 15	BSB,FD,WS
Wicklow River Tributary	102 + 0.15 km	0.1	SR	1.0	0.1	<0.1	0.2	LS	WW	D	April 1 - June 15	BSB
Wicklow River Tributary	102 + 1.0 km	2.2	W	100	0.5	<0.1	1.8	LS	WW	W	April 1 - June 15	BSB
Wicklow River Tributary	102 + 3.8 km	10.9	M	4.0	0.3	0.1	5.0	LS	WW	D	April 1 - June 15	BSB,FD,NRD,WS

N/A = not applicable
n/c = no channel
1 I = intermittent; SR = straight reach; M = meandering; W = wetland
2 NS = not sensitive; S = sensitive; LS = less sensitive
3 WW = warmwater; CW = coldwater
4 D = dry crossing; W = wet crossing
5 Crossings will be conducted according to the OMNR Generic Sediment Control Plans